ENVIRONMENTAL ASSESSMENT BOARD

Ontario

ONTARIO HYDRO DEMAND/SUPPLY PLAN HEARINGS

VOLUME: 60

DATE: Wednesday, September 18, 1991

BEFORE:

HON. MR. JUSTICE E. SAUNDERS	Chairman
DR. G. CONNELL	Member
MS. G. PATTERSON	Member

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ENVIRONMENTAL ASSESSMENT BOARD
ONTARIO HYDRO DEMAND/SUPPLY PLAN HEARING

IN THE MATTER OF the Environmental Assessment Act, R.S.O. 1980, c. 140, as amended, and Regulations thereunder;

AND IN THE MATTER OF an undertaking by Ontario Hydro consisting of a program in respect of activities associated with meeting future electricity requirements in Ontario.

Held on the 5th Floor, 2200 Yonge Street, Toronto, Ontario, on Wednesday, the 18th day of September, 1991, commencing at 10:00 a.m.

VOLUME 60

B E F O R E :

THE HON. MR. JUSTICE E. SAUNDERS	Chairman
DR. G. CONNELL	Member
MS. G. PATTERSON	Member

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L I S T o f U N D E R T A K I N G S

---Upon commencing at 10:04 a.m.

THE REGISTRAR: Please come to order. This hearing is now in session. Be seated, please.

THE CHAIRMAN: Before we start, Mr. Rodger, I think Dr. Connell has a question arising out of yesterday's examination he wants to put on the record.

PAUL JONATHAN BURKE,
AMIR SHALABY,
MARION ELIZABETH FRASER,
LYN DOUGLAS WILSON,
WILLIAM OSBORNE HARPER,
IAN DUNCAN MacLELLAN; Resumed.

DR. CONNELL: Thank you, Mr. Chairman. I wonder if I can refer the panel, Mr. Wilson in particular, to page 10651 of yesterday's transcript.

MR. WILSON: Yes, I have that.

DR. CONNELL: This is the discussion you had with Ms. Spoel about relations with government, and perhaps I could just focus on your words on that page, lines 11 to 13.

> "We are setting our own targets based on what we think we can accomplish from where we stand today with what we can accomplish in the coming year."

And then you go on to describe informal exchanges.

I think what I would just like to ask you to explore a little further the overall relationship between Hydro and government.

We have seen, of course, in the course of this hearing the proposed legislation, the amendment to the Power Corporation Act, and we have also seen what has been tabled as Exhibit 177, New Energy Directions, and clearly these kinds of initiatives are going to happen, the government is free to introduce legislation and new policy directions as it sees fit, and I presume the plans of Hydro and the path that this hearing follows will adapt accordingly.

I think what I would like to understand, though, with a little more clarity is to what degree Hydro is guided by government within the framework of the established or proposed legislation and policy.

And perhaps to that end I could refer you to Hansard, the Report of the Legislative Assembly, the Standing Committee on Estimates of Tuesday, 12th of February, and I think there are copies available.

The Minister of Energy and the Deputy Minister were appearing before the committee, and particularly if I could go to the second page which is E42, and right at the bottom of that page there is text, the final paragraph begins:

With regard to Ontario Hydro, we have asked it to undertake the following: It does have certain goals to the year 2000 on demand management. If we exclude interruptible power and load shifting, they have a goal of roughly 1,500 megawatts. Their goal for the year 2000 on energy efficiency and demand management is roughly 2,000 megawatts.

At the same time they have identified economic potential ..., I take it that should be;

...of roughly 6,000 megawatts. What we have asked them to do and discuss with us is to attempt to achieve within the next three to five years a doubling of their current goals of 2,000."

And then it goes on to non-utility generation, which is probably a subject for the next panel.

I think the matter that concerns me is really it comes to the question of the accountability of the Board and management of Hydro for the Plan.

I think my question is perhaps best formulated this way: Within the established and

proposed public legislative and policy framework, does it ever happen that in the informal exchanges to which you've referred the best judgment of Hydro is overridden by government direction?

MR. WILSON: I have no personal experience of a discussion where our best judgment was overridden. To date the government has not set any targets, megawatt targets for Ontario Hydro. What they have done in the new energy directions was ask us to double our efforts, and that's perhaps a soft way of saying try twice as hard, it's not identical to saying double your targets. And I don't believe that we have set targets and we've discussed targets with this Board that we think are beyond our reach.

So, I'm not sure that fully answers your question. But I guess it is our evidence that we have set targets, the government has shown -- Hansard is challenging us to reconsider setting higher targets, and as we have done so, and broadened the scope this summer of our efforts to fuel switching and really a broader view of a partnership with government and others to capture a greater share of the potential.

We have raised our targets and we've done so in the expectation that we'll get the cooperation from all the parties that we need.

DR. CONNELL: Well, thank you. That's satisfactory, Mr. Wilson.

I suspect that the same question may come up in the hydraulic panel and the nuclear panel and perhaps elsewhere, and it might at some point be desirable to have on the record an overall corporate view of the relationship between government and Hydro in the context of planning.

MR. SHALABY: If I could add, Dr. Connell, the government review of the Demand/Supply Plan in an appendix to the Ministry of Energy section, there is an appendix that describes the relationship between Ministry of Energy and Ontario Hydro.

DR. CONNELL: Thank you.

MR. SHALABY: It may be a year or a year-and-a-half old, but that was a snapshot of the perception of the relationship between Hydro and the Ministry.

THE CHAIRMAN: Sorry, Mr. Campbell, are you going to -- I was just going to say, for the purposes of the record, we should perhaps put the extract from the Legislative Assembly on as the next exhibit.

THE REGISTRAR: Yes. Exhibit No. 302, Mr. Chairman.

THE CHAIRMAN: Thank you.

---EXHIBIT NO. 302: Excerpt from Report of the Legislative Assembly, the Standing Committee on Estimates dated Tuesday, 12th of February.

THE CHAIRMAN: Sorry, Mr. Campbell.

MR. B. CAMPBELL: Mr. Chairman, in respect of Dr. Connell's questions, I certainly am not one who likes to complicate an issue. I think I always try to focus quite the opposite direction, and I hope I'm not doing that in this case, but there is some discussion of this matter in this year's Ontario Energy Board Report in connection, in particular, with the programs and initiatives taken by the government and Hydro with respect to Elliot Lake. I think it's fair to say that there are occasions on which there's very close communication at senior levels of the corporation about what's the appropriate role in each case, and that was certainly one of them, and the Ontario Energy Board had some views that it expressed on that matter in the Ontario Energy Board Report which was issued at the end of August.

I simply raise it because I think it really bears directly on the kind of considerations that you raised in your question, and you may want to look at that material as well.

I think it perhaps is also pertinent to add that in the proposed legislation those sort of lines of communication are one of the matters that are addressed. There is a very much clearer and more direct line proposed to be established with respect to policy directives and how that mechanism works that has a legislative base as opposed to one that had more to do with the understanding of how the Hydro, Ministry of Energy, government relationship would work, which is kind of the basis on which, for instance, decisions like the Elliot Lake decisions got made.

But, I would simply refer you to those other areas as well because they do contain and illustrate some discussion in this area in terms of practical real life examples.

...

[10:15 a.m.] DR. CONNELL: Thank you very much, Mr. Campbell, I will certainly follow up. And perhaps I might suggest that insofar as these matters have some bearing on the mandate of this panel, you might consider how the issues might be brought before us and at what stage of the hearing.

MR. B. CAMPBELL: Yes. It is clear that they do affect, that relationship does affect matters that are going to be coming before you in the various panels and we can deal with the results of those in each of the options panels as we go through.

I take your question to be a somewhat more general and systemic one, and I expect that that really is going to be very difficult to deal with except in the sense of the panels that are aimed much more at the integration and the kinds of trade offs that have to be made. Within each panel I think the people will be able to speak to how government initiatives have shaped their particular area, but I think your more general question is one that I would like to give some thought to, addressing more directly in one of the later panels, probably Panel 11, if that is satisfactory.

DR. CONNELL: Thank you.

MR. B. CAMPBELL: Mr. Chairman, Mrs.

Formusa will be occupying my chair for perhaps the next half hour and with the Board's indulgence I will leave and return at that time.

I spoke to Ms. Morrison this morning and I understood that the Board may have some conclusion with respect to proceeding with Panel 5.

THE CHAIRMAN: Yes. I think we have given this consideration and we have decided that Panel 5 will start no earlier than a week next Monday, whatever date that is.

MR. B. CAMPBELL: I believe that's the 30th.

Thank you very much, Mr. Chairman.

MR. RODGER: Thank you, Mr. Chairman.

With me again this morning is Dr. Lawrence Murphy, who will be assisting me.

Before I have a series of exhibits entered, I would like to advise the Board of a couple of matters.

First of all, for the purposes this panel, I will be asking questions not only on behalf of AMPCO but also on behalf the Canadian Nuclear Association.

Now, prior to this panel I submitted quite a number of questions that were in the nature of

technical matters involving calculation and clarification, and I did that before the panel started so I wouldn't have to take up hearing time going through that exercise. Mr. Campbell advises me that the answers to those questions are just about complete.

As well, there were four outstanding interrogatories with respect to this panel that I just recently received. I am expecting to get the clarification question shortly. I will just advise the Board that I intend to proceed as far as I can with my cross-examination but there may be some additional questions I may have as a result of the answers I get, so I may ask to come back, perhaps at the end of the panel, to ask those questions at that time.

THE CHAIRMAN: We understand that.

MR. RODGER: Thank you.

I handed Mr. Lucas a series of documents that I would like to enter as exhibits, please.

The first of which, it's one page, the heading is, "AMPCO Panel 4 Cross-Examination Outline."

THE REGISTRAR: That will be No. 303, Mr. Chairman.

THE CHAIRMAN: Thank you.

---EXHIBIT NO. 303: "AMPCO Panel 4 Cross-Examination Outline."

MR. RODGER: The next document has the cover page which reads, "AMPCO Panel 4 Cross-Examination Materials."

THE REGISTRAR: That will be No. 304.

---EXHIBIT NO. 304: "AMPCO Panel 4 Cross-Examination Materials."

MR. RODGER: The next document is an excerpt from a magazine which is put out by the Electric Vehicle Association of Canada.

THE REGISTRAR: No. 305.

---EXHIBIT NO. 305: Excerpt from Electric Vehicle Association of Canada, November 1990.

MR. RODGER: The next document was prepared by Decima Research and it is entitled, "A study of Ontario Public Opinion Towards Energy Issues and Activities for The Ministry of Energy", and that's dated February 1991.

THE REGISTRAR: That will be No. 306.

---EXHIBIT NO. 306: Document prepared by Decima Research, "A study of Ontario Public Opinion Towards Energy Issues and Activities for The Ministry of Energy", dated February 1991.

MR. RODGER: The next document is a survey, the cover page is "Ontario Hydro, Approach to Determine the Impact of Demand Management Activities on the Market Share of New Electrically Heated Homes",

dated December 19, 1988.

THE REGISTRAR: No. 307.

---EXHIBIT NO. 307: Survey, "Ontario Hydro, Approach to Determine the Impact of Demand Management Activities on the Market Share of New Electrically Heated Homes", December 19, 1988.

MR. RODGER: The last package is a group of AMPCO interrogatories which I will be referring to, and for convenience I have assembled them into one document.

THE REGISTRAR: No. 308.

---EXHIBIT NO. 308: AMPCO Interrogatories.

MR. RODGER: And other than what I have handed out just now, I will be referring to Exhibit 283, which was submitted to this Board by Energy Probe.

With respect to Exhibit 303, Mr. Chairman, this is just an outline of the themes that I intend to cover for this cross-examination. So that the Board can follow along.

CROSS-EXAMINATION BY MR. RODGER:

Q. I would like to first start, panel, by reviewing and establishing some first principles when we are talking about demand management. I want to confirm that I have a clear understanding of what the underlying values are when we talk about demand management.

Would you agree with me that the primary principle when we talk about Hydro's demand management plan, is that collectively we as a province and as a society, we have decided that there is a significant value, a significant social good in consuming electricity more wisely?

MR. WILSON: A. I think we agree with that, but that's not the underpinning of the plan. The underpinning is to reduce the total cost of electric service in Ontario.

Q. To reduce the...?

A. The total cost to society of meeting the electric service needs of the Province of Ontario.

Q. And as part of that, my observation of using electricity more wisely, is that also part of that picture?

A. Yes, it's part of it.

Q. And would you agree with me also that if there is this social good in using electricity more wisely, then the issue becomes how is society going to implement that objective, by what means are we going to achieve that goal. Would you agree with that?

A. If lowering the total cost is the end, then the means of how we go at it is also important, it clearly is.

Q. It seems to me in your hearing your testimony over the past number of days, that in deciding how Hydro, how the government, how the society is going to implement the objective of getting Ontario residents to use electricity more wisely, Hydro has made a number of assumptions, and I just want to review those assumptions with you and see if I have the understanding correctly.

The first is, that to implement Hydro's demand management plan it assumes that significant changes will have to be made in society. And to give you some very brief examples of where this has come out in the testimony so far, Ms. Mitchell in talking about the Espanola program, she talked about bringing about a cultural change using all the elements within a community, and for reference that was page 8895.

...

[10:25 a.m.] Mr. Wilson, when you talked about consumer spending habits, you also talked about

> "...behavioural change and a change in the culture."

Ms. Fraser, when you were discussing barriers to demand management, you described it on page 8629 as motivate:

> "...decision-makers to invest in demand management measures and energize the allies to make it happen."

And, Mr. Wilson, you also spoke about achieving these objectives and you said:

> "...success...will require a fundamental shift in peoples' behaviour. We will be working to accomplishing a culture shift in Ontario..."

And that can be found at page 8388. Do you recall that testimony that each of you gave in that regard?

A. Yes, I think that's correct, yes.

MS. FRASER: A. Yes, I do.

Q. And, Mr. MacLellan, on behalf of Ms. Mitchell?

MR. MacLELLAN: A. Yes, I believe that's what she said.

Q. Okay. So on the one hand you have this idea of significant behavioural and cultural change, and I suggest that that in itself is no easy feat, to try and modify or change an entire province's behaviour. Would you agree with that?

MR. WILSON: A. Yes.

Q. And inherent in that, I submit to you, there's a further assumption on the part of Ontario Hydro that, in fact, Hydro can influence peoples' behaviour. It's also another critical assumption; is it not?

A. Yes, it is.

Q. Now, on the other hand you've also recognized that people don't want changes to their lifestyles, and to try and give some meaning to that term, Mr. Wilson, with respect to forcing change on people, at page 8780 you said:

> "I think a lifestyle change is just the opposite of what people in Ontario want."

And you later said on page 8932:

> "I would take umbrage with anyone who insisted on coming into my house and removing it." You were talking about a refrigerator, "...they would be irate."

Do you recall that testimony?

A. Yes.

Q. And in further discussion of lifestyles changes, I think you would agree, panel, you said that it could mean little changes, such as waiting before you go to bed at night before you turn on your dishwasher to perhaps, at the other extreme, expending significant amounts of capital for retrofitting programs.

Is that a fair generalization of aspects of demand management that could be impacted on lifestyle?

A. I think the essence of the discussion was that it's our understanding of the situation that people in Ontario don't want to be told what to do, they want options, they want opportunities and they want choice.

Q. I understand, to follow that up, that through demand management Hydro is not anticipating any change in the quality in electrical service. I think you also made that observation; did you not?

A. It's a fundamental criterion we use in program design to sustain the quality of service if perhaps not the amount of electricity required to satisfy the service requirement.

Q. I'm sorry, I didn't hear about half the answer.

A. Oh, I'm sorry. I'll put this a little closer.

It's our aim in designing programs to make sure that the service needs are satisfied as well as, or perhaps even a bit better than they have been in the past but using less electricity in the process.

We had a discussion about diets the other day and it was characterized as the Jane Fonda diet, I don't know how accurately, but rather one in which what you want out of life is satisfied, you consume fewer calories in accomplishing that need.

Q. If I could sum up then, the three main assumptions with respect to demand management, they are that: Hydro can modify consumers' buying behaviour, they can influence consumer spending with respect to demand management measures; the second is that Hydro assumes that its demand management measures and the products purchased by customers and at the direction of Hydro, that that will in no way impair the quality of service that they currently enjoy; and the third assumption is, is that a change in spending habits with respect to demand management activities, that's not going to translate into lifestyle changes

that people don't want.

A. I think that's not a bad summary. Perhaps on the second assumption I would just add one qualifier.

If we've suggested in any way we think we can modify all this culture -- accomplish this culture change and buying behaviour and so on simply through our own efforts, we've left the wrong impression. We think it's a collective action.

Q. I understand, and I think you've made that clear. All right.

With that kind of philosophical background, as it were, I want to just look at the term demand management for a moment, and when we talk about managing the demand for electricity and this need for cultural change that we just talked about, isn't another way of saying demand management; aren't we really talking about energy consumption control?

A. No.

Q. And how am I wrong?

A. Well, I think the essence of the notion of control is that the choice is made by the controller and we don't see ourselves as the controllers.

Q. But isn't that the intent of demand

management, to get the public thinking differently about electrical use, to get them to think differently about what they should be purchasing, what they shouldn't be purchasing, thinking differently about what they should be heating their home with, et cetera, et cetera?

A. Yes, that's correct.

Q. I'm not saying that Hydro has the ability to control, but that's in essence what we're talking about, is how to consume differently and what society can do to more control that consumption?

MR. MacLELLAN: A. I think that's influence and information as opposed to control.

There have been a couple of times over the last week or so where the issue of banning specific products have come up. If we went to that extent, then we would be going past influence and over to control.

If we did in fact say, electric space heating is no longer appropriate, or when you start to do that it's a question of where you start and where you stop. There's a lot of products, electrical products on the market that are less appropriate than electric space heating, but that's where the control aspect would come in. And certainly for the residential public, it's a case of influence and

information.

Q. Would you agree, Mr. MacLellan, that when you have a change in legislation then that necessarily means an element of control, it's the law, you have to abide by the law?

A. You mean, if the legislation was changed to --

Q. For example, fuel switching.

A. If that gets into mandating specific types of heating for specific types of dwellings, yes, that would go over the line into control.

MR. BURKE: A. I think it's not clear from what you've been saying who is controlling and I think it's quite important that demand management be understood to be something that is distinct from direct load control, because there are all kinds of direct load control measures that involve hard wiring, water heaters in houses and so on, and we are certainly not talking about that kind of utility control of consumption.

The control over the decision either rests with the consumer or perhaps with some other body, but the demand management numbers and estimates that we're presenting here do not refer to direct load control.

Q. All right. Mr. Wilson, in your direct testimony you quoted from a Hydro board of directors resolution to the Minister of Energy whereby Hydro encouraged the government to introduce standards to be applied to all energy forms, and that can be found on page 8766.

Do you recall that testimony?

MR. WILSON: A. Yes, I do.

Q. Am I correct when I say when I talked about the broad societal goal a little earlier on, that it's Hydro's goal not only to try and influence people to use electricity more wisely, but that there is a bigger goal; and, that is, overall energy savings, we're not just restricting our efforts to matters involving electricity consumption?

A. Hydro's mandate is to provide energy conservation services -- pardon me, it includes that, and we certainly have a view of how best our efforts with electricity could be aided if the same kind of approach and philosophy were applied to all energy forms.

Q. But it's certainly been my sense throughout hearing the testimony and hearing you stress how this is a multi-party effort, the government, the municipal utilities, so forth and so on, that the

primary societal goal is overall energy savings. Is that a fair characterization?

A. Well, the provincial government's energy policy is overall energy savings and we take our lead from that policy.

Q. When Hydro -- let me rephrase that. Before Hydro introduces specific demand management programs, does it take a comprehensive review of total energy consumption of that program before it is introduced into the marketplace?

I'll just give you an example. The efficient light bulb, for example; before that program came out, did Hydro take a look at how much energy was consumed in manufacturing that light bulb, how much useful heat the light bulb would give off during its lifetime, and the amount of energy taken to dispose of that light bulb after its life expired? Is that kind of analysis undertaken?

MR. MacLELLAN: A. In a fashion. We looked at some analysis that some other parties had done such as Rocky Mountain Institute and Lawrence Berkeley Labs. So we didn't do our own analysis of those things, we took the analysis of some others, and concentrating more on the specific energy use of the product.

Q. Was that analysis done with respect to the efficient lighting program that -- for example, the lighting program that was in the Loblaws Stores?

A. Yes. As I said, we looked at some other analysis from the United States and took that for the total product energy use.

Q. You would agree with me then, I take it, that if it turned out, just as an example, that that efficient light bulb program, if it turned out that that light bulb consumed more energy to be manufactured and disposed of than it saved over the course of its life in someone's home, then that wouldn't be an appropriate program; would it, because it goes against the main objective of achieving overall energy savings?

A. We would have to rethink it, yes.

Q. Would you agree with me that it's possible to have new technological developments, particularly in the industrial sector, which may increase electrical consumption and yet be very, very efficient and also reduce overall energy consumption?

Ms. Fraser, is that...

MR. WILSON: A. Well, I think we've already answered, yes, to that question.

Q. And, certainly, promoting that kind

of activity, that would be entirely consistent with the objectives that we have been talking about this morning of using electricity more wisely and also achieving overall energy savings?

A. Yes, I believe that would be consistent.

MR. BURKE: A. But I don't think one could promote in the same manner as we do demand management.

Q. Why is that, if the final objective is good?

A. Well, the issue is that there are avoided costs in the case of electricity supply and it's not clear what the avoided costs are in the case of encouraging technology which causes people to switch fuels, for instance if they're doing something inefficiently with one fuel, towards electricity.

So, that would have to be made in a broader policy framework, and so one could be in favour of providing information for and so on, that sort of switch, but the question of, could one back with incentives, could the electrical utility justify backing with incentives that sort of switch, becomes a broader question than I think the utility itself can answer.

...

[10:40 a.m.] Q. And if the answer to that avoided cost question was yes, it is efficient under Hydro's test, then presumably Hydro wouldn't have any problem in promoting that new electrical intensive technology?

MR. WILSON: A. The approach we have taken in the past in this area --

Q. I wonder, first of all, Mr. Wilson, you can expand upon that but would you answer my question, first of all?

A. Could you restate the question for me?

THE CHAIRMAN: I think the question was real addressed to Mr. Burke.

MR. RODGER: Q. Okay, Mr. Burke.

MR. BURKE: A. I think we have examples of fuel switching from electricity to other fuels that we have examined from the point of view of the total customer cost test in a very simplified way so far, and I guess in principle one can go the other way, but I think to do so requires a much broader provincial policy overlay on the values of these fuels.

Certainly there were specific circumstances in the 1980s that created an environment in which the utility could be clearly more interested in encouraging the demand for electricity, and that was

a surplus situation, we discussed that situation earlier on in this panel. In a situation of capacity shortage it's not so clear exactly how you would do that analysis.

Q. So, Mr. Burke, part of your answer was, what is required is a broader provincial policy, and I take that to mean a broader provincial policy than is currently in place?

A. Yes. For the utility to offer incentives for these technologies, there is no question at all on the simple matter of providing information concerning the efficient use of energy. But for the utility to offer incentives to increase use to save energy as a whole as opposed to electricity, that becomes a broader issue and one for government policy I believe, just as fuel switching has been something that we have waited for government policy direction on.

Q. Mr. Wilson, do you have anything to add to that?

MR. WILSON: A. Nothing useful.

Q. Okay. Staying with you for a moment, Mr. Wilson. You confirmed that while there was a certain amount of load building in the DSP, that the primary thrust was not load building, that is not as part of the plan; is that correct?

A. I think what I said was there are some activities particularly in the area of research support for electrotechnologies that could have the effect of load building, but the scale of the effort is small and the intent of it is customer service and not load bidding.

Q. Now perhaps Mr. Burke's earlier answer has already clarified this next point, but does this mean that it is now Hydro policy to overlook or to not prepare for new technologies just because they may result in an increased demand for electricity?

A. No, it's not.

Q. Now, remember that we are dealing hear with the 25 year planning horizon and just to kind of build on that point. I wanted to know how the Hydro system, the Hydro plan, would incorporate a new technology like electric cars. I handed out, it's now Exhibit 305, just an excerpt from the November 1990 edition of Electric Propulsion, which is published by the Electric Vehicle Association of Canada. I wanted to give you some comfort that this just wasn't some wild idea from science fiction, and that things are actually going on in this area. Just to give you a quick overview. I thought this was a particularly insightful issue.

On the front page we see that Hydro Quebec and a battery manufacturer are doing research into the area of electricity storage; that the U.S. automobile manufacturers are having more and more interest in electric vehicles, and I can confirm that I spoke with AMPCO members who are in the business of manufacturing automobiles and they are doing a lot of research in that area as well.

The article two-thirds of the way down the page, "New Carbon Rules "Force" EV Production", and it is an article out in the State of California. Two per cent of all new cars sold in the State beginning in 1998 will be zero-emission vehicles.

On the reverse page we see the House of Commons and Senate have established an Appropriations Committee for electric vehicle development.

And also, the article to the right, interestingly enough, Canada targets for 20 per cent CO(2) reduction. On the second last paragraph there is a reference to the Energy Minister Jake Epp where he says he agrees with a council of federal and provincial energy members who have warned that a 20 per cent reduction in CO(2) emissions by 2005 could cause significant economic dislocation and would require significant changes in lifestyle.

Perhaps it goes back to the theme that we started with about this need for change of lifestyle and perhaps that tends to corroborate that.

Could you tell me, Mr. Wilson or Mr. Burke, how has this new technology, which I don't know how familiar any of you are on this panel about this technology, but there is some thought that it could be very electrically intensive if we have electric cars, and of course electric cars need a source of power to recharge the batteries, how would this type of technology fit into the long-term plans, remembering that are dealing with a 25 year planning horizon?

MR. BURKE: A. There was evidence given on this matter in Panel 1 and also in an interrogatory response prepared for Panel 1, a report on electric vehicles prepared by the load forecast department was filed. The report was prepared last summer. In the course of it we talked to the senior people at the Electric Vehicle Association of Canada to seek their input on what they thought the future of electric vehicles held. As a result, the paper that is -- well, at least in an interrogatory response, and we can get it for you if you would like to see the paper. It prepared three scenarios of penetration of electric vehicles, and the median case for that is built into

the basic load forecast.

There is a high case outlined in that document which would, as I recall, and subject to refreshing my memory of the exact numbers, could add 3 or 4,000 megawatts to the year 2015 load but was considered unlikely.

There are competing technologies to electric vehicles in the source for cleaner, less polluting cars. And the information that we have from Los Angeles and the efforts that they are sort of undertaking to meet their pollution restrictions and so on in the LA basin suggested that the role of electric vehicles is not going to be the dominant one at all in the solution to the LA problem.

So, that our median case, I think, has built in several hundred megawatts of electric vehicle charging load toward the end of the time horizon of the basic load forecast prepared in 1990.

It is something that we have looked at. The Electric Vehicle Association itself is not overly optimistic in my experience of that discussion. But I think in the context what are talking about here, it's something that we have considered for the basic load forecast, and it has also been highlighted as one of those risk elements that we take into account when

people talk about the effect of environmental policies on the load in the long run, whether they will necessarily be to reduce load; it could have the effect of increasing load. At this point in time we have said in Panel 1 that we are not sure where that will balance out, because there are clearly examples of load increasing technologies that have environmental benefits that may be pursued by society.

I guess our position was, we haven't enough information at this time to come down on whether the high case will be followed in North America and in Ontario. There are certainly risks to the downside as well that we discussed in Panel 1 through environmental policy applications.

So this is one and it is definitely one that offsets a lot of, potentially offsets a lot of reductions in load that may come about through efficiency gains that are mandated or whatever.

Q. All right. So, although Hydro is not on a campaign of load building per se, this type of technology is incorporated in the basic load forecast?

A. Definitely.

Q. I take it that would be your same response if industries in Ontario who are contemplating expanding their facilities, or, for that matter, new

industries that may be wanting to come to Ontario, they shouldn't be concerned by this lack of no load building or no load building program; that that is all encompassed within the Panel 1 discussion that we had?

A. The Panel 1 discussion is in the context of no interference by Ontario Hydro in the marketplace.

Essentially, we are not discouraging the consumption of electricity in Ontario; we are only trying to make it efficient where it is consumed. In the case of industry, for instance, our load forecast includes a lot of electric arc steel making, thermal mechanical pulping technologies that are electricity insensitive but are efficient from a variety of perspectives, including environmentally beneficial.

It's also interesting to note that the Ministry of Energy in its high conservation case includes several examples of the increased use of electricity in the industrial sector for environmental reasons, and they go a long way to offsetting the conservation effects in their high conservation scenario. I think that's the scenario in Exhibit 249.

The only issue here is really a question of whether Hydro actively intervenes to promote those technologies as opposed to providing information about

them, but we are not doing anything to discourage that sort of activity at all.

Q. Just not promoting at this time.

A. Well, not promoting in the sense of financially assisting.

Q. Okay. The next point I want to address is what I have termed on my outline the ambitious nature of Ontario Hydro's demand management program.

Mr. Wilson, in your direct testimony, and with respect to energy conservation, you stated that Hydro was going to make sure that Hydro has the most comprehensive and effective energy conservation effort in North America. Do you recall that?

MR. WILSON: A. That's our goal, yes.

Q. And would you agree with me that with the recent changes with respect to fuel switching, that Hydro is not only now promoting the most ambitious demand management plan on the continent, but it is now in fact the most ambitious demand management plan by any utility in the world?

A. Gosh, that sounds right.

Things are changing so fast in this business --

Q. Perhaps you could answer my question

first.

A. I can't say that with any confidence.

Q. Go ahead.

A. Well, I was just going to say that the pace of change in demand management, in North America in particular and increasingly elsewhere, is such that it's difficult to say from day-to-day who has got the most ambitious program.

We would like history to look back on the 90s as a period where indeed we were recognized as being one of the leaders and having the most ambitious and effective program in North American.

Q. We will just leave it to the continent then, the most ambitious on the continent today.

Now, Mr. Burke, I thought it was appropriate when you described the road ahead for Hydro in achieving the attainable demand management, you said at page 9445 that effectively Hydro is looking at two-thirds of a decade at full throttle. Do you remember that?

MR. BURKE: A. Yes.

Q. Now, I want to refer to specific cases a little later on, but right now I want to talk about Hydro's Case E for a minute, and that can be

found at page 1 of Exhibit 304. You will recall that this case included EEI mandated standards and mandated fuel switching including new buildings and retrofits. Was this 6,400 megawatts of peak load reduction by 2000? Is that right, Mr. Wilson?

...

[10:55 a.m.] MR. WILSON: A. I'm sorry, I'm a little slow in staying with you on this.

MR. BURKE: A. There's a number of 4,700 megawatts for EEI and fuel switching. I don't see where the 6,400 number comes from.

Q. Okay. Well, maybe I'm mistaken then. All right, 4,700.

And, Mr. Wilson, when you were talking about this case you used an analogy of automobiles and you said when you sell a car it has to be certified and brought up to safety standards, and with respect to this Case E you said:

"If we can do it for cars we can do it for buildings."

And that's on page 8581. Do you recall saying that, Mr. Wilson?

MR. WILSON: A. Yes, I remember discussing that.

Q. Mr. Wilson, I must tell you that my client was absolutely stunned that you would even present this case to this Board.

Is it my understanding that it's Hydro's testimony that this case can be achieved in the next eight years?

A. I think the answer is, yes, if the

will can be generated to do these things.

Q. Can you tell me how many residential properties would be affected by this case, approximately?

MR. BURKE: A. Well, we're talking about all of the electrically heated housing stock in gas areas in this case, and that is 250,000 houses today and an incremental 70,000 between now and the year 2000 of new housing.

But I guess what you're talking about, you seem to be concerned about the fuel switching of existing houses, so that's the 250,000.

Q. Okay. So we have about 310,000.

A. Excuse me, I'm sorry. 250,000 is the number of houses that are electrically heated, the total potential is based on two thirds of that amount, 167,000 houses.

Q. Okay. Well, just leave with the 160,000.

THE CHAIRMAN: This is in non-gas areas; is that right?

MS. PATTERSON: Gas.

MR. BURKE: No, this is in gas areas that would switch to gas.

THE CHAIRMAN: I am sorry, in gas areas.

MR. RODGER: Q. And in terms of commercial properties affected, how many would you be looking at roughly?

MR. BURKE: A. Well, we don't have it in terms of number of properties. In terms of commercial floor space, I think we have said a quarter of the existing floor space.

Q. And what would be a rough approximation of that amount?

A. In terms of millions of square feet?

Q. Yes.

A. It's a number I don't keep at the top of my head. Just a moment, please.

MS. FRASER: A. In the year 200 there will be 3.7 billion square feet.

Q. 3.7 billion?

A. Yes.

MR. BURKE: A. That's the total, it's a quarter of that.

Q. Okay. So, staying with this car analogy, Mr. Wilson, is it Hydro's anticipation, and with respect to this Case E, that when a house is sold it must be converted before the title can be transferred?

MR. WILSON: A. I suggested that was one

mechanism. We didn't work out the game plan for executing or for universally doing all these things, but I suggested that was one approach that could be considered.

Q. So that is a legitimate approach, the homeowner would have to convert before he could transfer title?

A. That's in place in a small number of municipalities in the United States right now. I don't know how stringent the upgrade requirement is, but just that somebody has done that, it's an approach that could be considered.

Q. And it's your testimony that that's feasible for Ontario in the next eight years?

A. That's our position, yes.

Q. Okay.

MR. BURKE: A. Just to clarify, I think what Mr. Wilson was referring to was, what is in place in several jurisdictions is requirement to upgrade the efficiency of a house. I'm not sure whether we know whether or not fuel switching upon sale is in place anywhere in North America.

Q. But you would agree that that might be necessary in order to achieve the kind of targets that Case E represents?

MR. WILSON: A. Case E assumes that it will be a requirement that existing houses be converted from electric space heating to gas, and that's what we've assumed in this case.

The question of how you pace that, where you start, is a programming issue that we have not worked through.

My example was one to illustrate that it wasn't a totally inconceivable kind of proposition.

Q. Well now, I think that's a change. I understood you to say that this was a feasible case. I mean, is it just so far an extreme that 99.9 per cent it's not going to happen, but it might happen; or is this achievable?

A. I guess it's our position that given government determination to accomplish this level of fuel switching and electric demand reduction, because we don't have the authority on our own part to require things like this, if the will was there, then we believe this could be accomplished.

Q. Now, to try and put this case into some perspective, I believe it was Ms. Fraser that testified with respect to retrofitting, I believe it was a lighting program that's currently going on at Ontario Hydro's main building at College and University

Avenue. Was that you, Ms. Fraser?

MS. FRASER: A. Yes, we've got some test installations of T8s and we expect to retrofit the T8s next year.

Q. And the floor space at that office, that must be comparable to dozens of commercial buildings across the country. Do you agree with that?

A. I believe it's in excess of 2 million square feet. It's one of the larger ones. For instance, the Scotia Plaza which just changed hands yesterday, is 1.9 million square feet.

Q. Okay. Just on that lighting retrofit, what's Hydro's estimated cost of that project?

A. I don't think I have that number.

Q. Can you give me an estimate?

A. I don't have it with me. I couldn't even ballpark it.

Q. So you don't know if it's $1 million or $5 million?

A. I'm just trying to recall, there was an installation at Carleton University with 30,000 fixtures and it was, I think, around $1 million, and we would be looking at -- we currently have 60,000 fixtures at Hydro Place.

I believe if we went to a T8 lighting system we would not replace one for one, we would go to fewer fixtures, so it would probably be somewhere in the neighbourhood of $1.5 million.

Q. $1.5 million. So sticking with the Scotia Plaza as an example, if this Case E was to be realized, the Reichmann Brothers would get a letter saying, you're mandated to spend $1.5 million on lighting. That's what --

A. This meant -- no, my understanding of this case is that the mandation would be government.

Q. Right.

A. And they would require things to happen, yes, the same way that there's, you know, you have to put in sprinklers or you have to remove asbestos, or so on and so forth.

They would also get benefits from that $1 million. It's really an investment in energy saving and they would get a return on that.

Q. Well, Ms. Fraser, you're the expert in the commercial sector, what do you think the reaction would be to landlords across the province right now in this recession when, if not Hydro, the government saying: Hey, guys, put a couple of million bucks into your building to change the lighting system.

A. I don't think this scenario determines who's going to pay for it. Basically we've just looked at it in terms of it's cost-effective from a total customer cost point of view.

The actual way in which anything is paid for in that formula then is an issue for program design which we haven't gone into in that detail here.

Q. So are we saying that -- I'm sorry.

A. The response we've had to our lighting program so far has been very positive, 98 per cent of the people participating in the program think it's a wonderful thing and T8s are taking off much faster than the industry expected to in Canada as a result.

Q. So we could --

A. So the benefits are there. It's a win/win/win all around.

Q. But right now we're not sure whether the private sector picks up the tab, the government picks up the tab, or the ratepayers generally are going to pay to implement all these programs?

A. That's right. The only thing we've done at this point is traded this off in the total customer cost test to determine what's economic and then what portion of that is economic can we effect

within the next nine years.

Q. And what about my question to you; what if it was decided that since owners of - just sticking with the commercial properties - they're going to save in the long run, if the government decided, no, private sector has got to pay for this, what do you think the reaction would be, given today's climate?

A. I think it would be quite a very strong reaction, there's no doubt about it. We characterize Case E as a Draconian approach to it.

Q. It's Draconian. Have you got any kind of estimate, and given that you've only got eight years to realize on this Case E, what you say is realizable, how many conversions per month it would be among the residential and commercial sectors from 1992 to the year 2000 in order to realize this case?

MR. BURKE: A. Well, effectively there's conversions, there's efficiency improvement. Pretty well every house in Ontario that's electrically heated would have a large amount of activity going on in it at some point in the decade and all the other houses that are not electrically heated, there would be programs influencing the appliances they buy and so on.

The appliances and all that are just a question of replacement upon failure of the appliance

by more a efficient model and I don't think there's anything particularly difficult about that, but in terms of all the other houses, basically 500,000 electrically heated houses over, roughly - I look at it as nine years, I do include the year 2000 in this - so roughly nine years left.

But, in practice, we have expected in these scenarios that the decisions on mandation and so on would not come into force until about 1995, so that there would be a ramp between now and 1995 of increased activity by Hydro in anticipation of the coming into effect of legislation in 1985.

So that between 1995 and 2000 is when there would be a very large amount of activity. If there were 300,000 houses left to do in the last five years, 60,000. That gives you a rough idea.

Q. So it's really an unbelievable amount of effort and change to make this case happen?

A. I wouldn't go that far. In the days of the off-oil program, it's my understanding that roughly 80,000 furnaces were converted a year in Ontario.

A lot of those were upon replacement, so it made life easier, but the magnitudes are not totally unreasonable.

Q. Mr. Burke, is it really fair to compare a furnace to retrofitting Scotia Plaza?

A. I thought we were discussing the number of houses that you would have to visit or retrofit in the decade. The commercial sector is another issue.

Q. Okay. So it remains your evidence that -- well, maybe it doesn't remain your evidence -- is Case E now achievable or is it purely fantasyland?

MR. WILSON: A. Well, we have put this forward, I guess, about four weeks ago and we thought it was feasible, Draconian but sort of an extreme case. Within the realm of the achievable, we didn't characterize it as likely, in fact, we proposed to the Board that Case C or something very close to that be the one that the Board accept for planning purposes, not Case E.

Q. So, the Board should not consider Case E as even being in the picture in terms of purpose.

A. We're not assuming Case E is the appropriate case for planning.

Q. Okay.

MR. BURKE: A. Well, I can't resist, but I think Case E is a scenario, it has to be seen as a

scenario, and there are many ways of achieving the same result and not simply the ways that are described in the scenario.

So, if you're asking about the scenario, I think that's probably characterized this way, but one could certainly open up the question and look at completely other options that are not considered here.

THE CHAIRMAN: Would you characterize all cases as a scenario; A, B, C, D and E?

MR. BURKE: That was the intent.

MR. RODGER: Q. This takes us back to our discussion when I first started my cross-examination, that this reflects a part of Hydro's assumption of modifying consumers' purchasing power; doesn't it, because it's assuming that customers are going to do certain things.

I guess my question to you, given Case E is: Does this also reflect your assumption of no adverse changes to lifestyle by making the kinds of capital expenditures required to make Case E a reality for both commercial and the residential sectors?

MR. WILSON: A. I guess Ms. Fraser has answered the question best already. She has characterized the spending that would be required where mandation was relied on extensively as in Case E to be

an investment which generates returns.

There are questions about who pays what portions of these costs, and depending on who paid it would certainly have very different effects on the purchasing power of, as you put it, of the different players.

Q. Okay. Let me leave Case E. I don't want to go through it in any detail because I know it's already been made an exhibit, but Exhibit 283 was an excerpt from the Ontario Energy Board's findings in HR 20, and you're all aware that the Board concluded that the $240 million which was diverted from supply studies, nuclear, pre-engineering and so forth, they said:

> It will not likely result in cost-effective energy management savings but only in additional costs and lost revenue in the short term. In the Board's view this is not short-term pain for long-term gain; rather, it is short-term pain for little or no gain.

That's found at page 29. I take it a part of the problem with this redirection of funds to Hydro is that it took Hydro totally by surprise, it was totally unexpected?

MR. WILSON: A. I was surprised, but I'm not sure whether Hydro was surprised.

Q. Well, were your colleagues on the panel? Was there anybody that was not surprised by that change in direction of funds?

MS. FRASER: A. I was surprised. I was not surprised by the intent of the policy, however.

Q. And if I suggest that to make matters worse this money landed on your doorstep --

MR. B. CAMPBELL: Or better.

MR. RODGER: Or better.

Q. That this money landed on your doorstep and there's also this sense of urgency because there's only eight years left to meet some of the targets you're talking about.

So is that part of the problem that the Energy Board was commenting on, you have funds that you didn't expect to get and yet there's a sense of urgency in the organization, that I sense, to try and meet some of these very ambitious targets that we have talked about and, in fact, the Board said:

> The fact that Hydro is struggling to spend the funds is of little comfort to the Board.

Is that a fair characterization of some

of the problems that have been encountered by Hydro with respect to those funds?

MR. WILSON: A. I think I said earlier, and I'll say it again, that as of the end of May when we prepared ourselves to talk to the Ontario Energy Board, we hadn't allocated $240 million to program activities.

At that point we had a substantial portion of that assigned to different program initiatives and we tabled a list of the initiatives, pointed out that each of those initiatives was an extension, an extrapolation -- not an extrapolation, extension or broadening of the program mix, that each of the initiatives had passed this screening test of the total customer cost test, that it was cost-effective, that it matched the additional budget, if you like, it matched opportunities that were developing in late 1989 and through into 1990 -- or, pardon me, late 1990 and early '91, and we were quite comfortable, although I believe the Energy Board wasn't, that this money would be effectively spent.

...

[11:15 a.m.] Q. Now, given the Board's comments, and speaking now as system planners and remembering that we are involved in a 25 year planning horizon, are you concerned about this redirection of funds since a lot of this pre-engineering work and supply studies work is going to be done anyway, at some points it's got to be done. It's not a question of if Hydro can do that; it's when. Are you concerned that the redirection of funds away from those studies is adding more uncertainty in terms of maintaining a reliable supply in the long term?

THE CHAIRMAN: That may be a more appropriate question to another panel.

MR. RODGER: I thought Mr. Shalaby was reaching for the microphone, Mr. Chairman.

MR. SHALABY: I prefer this advice.

I indicated in my evidence that the redirection of funds away from preparatory and environmental work on the supply options limits flexibility and it limits the supply opportunities in the future.

Now, whether you translate that directly into impact on reliability and cost of service, that's another leap.

If one is confident we can meet the

reliability requirements and service requirements by demand management and by non-utility generation, the impact on customers in terms of reliability will not be significant.

So, all the diversion of fund does is it limits the availability of the nuclear option early in the next decade.

MR. RODGER: Q. Just one more question on that point, Mr. Shalaby. What is your view of the latest that those supply studies could get underway in order to maintain that long-term reliability?

MR. SHALABY: A. That's when we go to the next panel at some future date.

Q. Okay, I will wait.

Now, throughout the hearing to date, from load forecast to avoided cost, I think we all recognize that the process is really riddled with a number of uncertainties. You would agree with that, I take it.

MR. WILSON: A. Riddled is a very colourful phrase. We are well aware of the planning uncertainties and we have discussed a number of them.

Q. Fair enough. And with respect to demand management however, I understand that Hydro is proceeding on the basis that the 5,200 megawatt block of savings achieved by demand management, that is a

certainty in terms of planning purposes.

MR. BURKE: A. I think that would oversimplify the planning process.

What matters for supply planning and ultimately the reliability of the electrical supply system is the primary load forecast. And the primary load forecast uncertainty is dominated by the uncertainty in the basic load forecast.

While we have indicated in a study that was submitted in interrogatory responses to Panel 1 that we did not have good information on the extent of the uncertainty associated with demand management programs and how that would impact on the overall uncertainty of the primary load forecast, we, in doing simulation studies looking at various possible ranges of outcomes for the demand management programs, found that it was reasonable to assume that the primary load forecast would have the same absolute uncertainty as the basic load forecast.

What happens with demand management is that there are offsetting effects, that in cases of high load growth it is conceivable to -- and that's sort of driven by high economic growth. It is conceivable to imagine that there would be higher of higher potential for demand management and vice-versa

for low load growth. The issue is the penetration rates and the uncertainty associated those, and that's why we don't in fact narrow the band of uncertainty in looking at the primary load forecast rather than the basic, that because there remains some uncertainty about penetration rates.

I think the relevant question is, what is the uncertainty in the primary load forecast in total, and that has to be seen in the bigger picture of the basic load forecast uncertainty.

Q. Perhaps riddled was too colourful. There are,many uncertainties, I will accept that.

If you could turn to page 2, please, of Exhibit 304, and this is the independent consultants review of Ontario Hydro Expectation and Targets for Demand Management Activities, the RCG/Hagler Report, and this has been referred to earlier on. If you could turn to page 3, the next page, the heading is, "Lessons Learned - Implications for Hydro." I just want to read that top paragraph. It reads:

> "Utilities with more modest targets and longer lead-time to target attainment can suffer program failures and substitute new programs to take up the slack. Hydro is more constrained in this

regard in that it must deploy all of its "rain-makers" up front, holding only second-string options in reserve. This serves to create more of a risk exposure of target shortfall or, at the very least, delays in the dates by which targets can eventually be met."

Now, keeping that in mind, I wonder if you would go to my first interrogatory of Exhibit 308, and in this interrogatory we asked you about the risk exposure of target shortfall.

THE CHAIRMAN: This is Interrogatory 4.24.62?

MR. RODGER: That's correct, Mr. Chairman.

THE CHAIRMAN: It should be added to 261.

THE REGISTRAR: That will be 261.46, Mr. Chairman.

MR. RODGER: Thank you.

---EXHIBIT NO. 261.46: Interrogatory No. 4.24.62.

MR. RODGER: Q. In this interrogatory we asked you about risk exposure of target shortfall, and the answer that Hydro came back with, which is shown here, is: Hydro has not analyzed the extent this risk exposure and the likelihood of falling sort of EEI

targets.

My question is, given the warning in the RCG/Hagler study, why have you not incorporated that type of analysis into your process with respect to demand management programs?

MR. B. CAMPBELL: Mr. Chairman, could I just ask my friend for some clarification. Is he speaking in terms of the demand management plan itself or the application of that plan within overall planning process that leads to an integrated Demand/Supply Plan? If it is the latter, then that question is for Panel 11.

MR. RODGER: No, it was the former question.

MR. BURKE: Maybe I will just repeat what I said earlier, which was that we don't have the sort of historical information which would allow you to estimate empirically the risks that there are to program success and failure.

When we did the simulation study which looked at sort of varying distributions of the likely outcome of EEI results and applied that distribution in the broader context, as I mentioned, of the uncertainty associated with the primary load forecast itself, given the various correlations there are between success and

EEI and other elements that contribute to the load forecast, we concluded that the plan should be undertaken with roughly the same uncertainty at the primary level as had been determined at the basic level, rather than to narrow the uncertainty band, which is a tempting thing to do given that there is an inverse correlation between EEI and load; that is, you can expect to get more load reduction in high cases, there is more potential anyway, and a lower load reduction through EEI in low growth cases.

My sense is that it is the bigger picture, the primary load forecast picture that is more important than being able to specifically analyze the risks of this particular program element, EEI.

MR. RODGER: Q. So then my understanding is, just to end on this point, that with respect to those EEI targets, you just haven't analyzed the risk of falling short?

MR. BURKE: A. Maybe I am not sure what you mean by analyze. Could you explain what sort of analysis you had in mind?

Q. Well, going back to my initial point that demand management targets are seen as a certainty in the plan and yet individual components of that, you haven't looked at what happens if we are wrong, what

happens if we fall short in this case in the EEI targets, and what is the contingency plan in place in case you do fall short. I guess my concern with this answer is that you just haven't analyzed that risk, and if that's the right answer fine, I will leave it with that.

A. I think what I am saying is there are many risks and this is one of them, and they are hopefully reflected in the uncertainty band for the primary load forecast which underlies the supply plan. The supply plan recognizes a bandwidth of future requirements and this is one of the many uncertainties reflected in that.

MS. FRASER: A. I would also point out that we are not going to wait until the year 2000 to find out whether we have achieved a target or not.

We track our results monthly and we fine tune programs as we go. In Interrogatory 4.20.45 it details the changes to incentive programs that we have made so far, and we certainly are prepared to make more to get as much uptake as we want.

MR. SHALABY: A. One added point in this regard, and at the risk of getting counsel mad at me I will discuss that at Panel 11.

MR. B. CAMPBELL: That's a serious risk!

MR. SHALABY: Page 15-68 has a discussion about flexibility and it really sums up what Mr. Burke was saying. If you have a plan that's flexible enough to respond to upper load growth, it will be flexible enough to respond to shortfalls in demand management provided you don't get hit with both upper load growth and low yield in demand management.

What we are presenting to this Board is a plan that has flexibility. If we do have approvals and we have engineering work underway and we have options open to us to respond to upper forecasts, we will have a package of options ready to respond to many other contingencies as well as, such as delays in NUGs or poor performance of our existing units or a dry year that has low water conditions, many, many other contingencies that we have, including low yield in demand management.

MR. RODGER: Q. I guess, Mr. Shalaby, the trouble I am having, when I review the Hydro evidence it's not clear to me at what point Hydro begins to shift gears in terms of changing to alternatives, changing plans, if it's finding out that it is not meeting its demand management targets.

MR. SHALABY: A. Well, I think if we project the reliability of service and the cost of

service and environmental impacts of our existing system to be unacceptable, we will take measures to the extent we can to correct that. But it all depends on the flexibility that we can attain at this time of having the options open to us.

THE CHAIRMAN: Can you give me the page in Chapter 16?

MR. SHALABY: It's Chapter 15, Mr. Chairman, 15-68.

THE CHAIRMAN: 15-68.

MR. RODGER: Would you like to take the morning break, Mr. Chairman?

THE CHAIRMAN: All right. Thank you. Fifteen minutes.

THE REGISTRAR: The hearing will recess for fifteen minutes.

---Recess at 11:30 a.m.

---On resuming at 11:50 a.m.

THE REGISTRAR: Please come to order. This hearing is again in session. Please be seated.

THE CHAIRMAN: Mr. Rodger?

MR. RODGER: Thank you, Mr. Chairman.

Q. If I could ask you to turn to the second page of Exhibit 308, which is Interrogatory 4.24.61, which I believe that will now become 261.47.

In a part of this interrogatory, we asked what Hydro will do if a particular demand management program fails. If I could paraphrase the answer, I understand Hydro says that if one program fails, we will stop it and we will insert another program.

Is my understanding correct in that regard?

---EXHIBIT NO. 261.47: Interrogatory No. 4.24.61.

MS. FRASER: A. Not quite. The program would be either revised or dropped. There are really two options. You would have to evaluate to see what the problem was, and if it were an inherent problem in program design, you would change that; if it were promoting a technology that was a dog, well, you would have to accept that and let it go at that.

Q. I take it then that if a program is dropped, it's not going to leave a void there; Hydro is going to put another program in its place; is that correct?

A. That's right, we are going after all the economic demand management that we can find.

Q. Before the break we talked about the RCG/Hagler study and I read at quote, and I took from that quote that part of the problem, or part of the pressure that Hydro is under with respect to its demand

management plan is that all its -- and the Hagler report describes them has first-string players, all your first-string players are on the field first and if some of those drop out, you have these backup programs that come in that are second string. My question is, the fact that may have to put in second-string programs, if that occurs, isn't the probability of meeting your program targets a lot less because you are using less than the optimum programs?

A. Basically I don't think I would agree with this consultant's characterization of rain-makers versus second-string options.

I think it's an issue in terms of as we roll out to the year 2000 and beyond, because there is nothing really magical about the year 2000, and that there are things that we have to stage in order to energize the allies as I have talked about, in order to build infrastructure, and we are really doing both of those things as we go now. We are getting the infrastructure ready and we have got customer programs that are working.

So, the issue that we pull all the best ones out first and when they don't work we get something else to do it isn't necessarily the case.

What I would say, and this is probably --

I don't want to get back to scenario E again, but perhaps the degree of choice that gets left to us as we move closer if we haven't met our targets in terms of what it is, the approaches that we are going to have to take might be a little bit different, and we might have to try different levers in the programs and different mixes of elements to the programs than we are currently planning on. But that's more of a strategic evolution over time than it is sort of pulling out your best player and putting in your second stringer.

Q. I will tell you where I am leading to, Ms. Fraser, staying with you. My client got very concerned during your evidence in chief, page 8864, when you said that we, speaking of Hydro, basically did a lot on faith in these first couple of years in terms of setting ambitious targets.

Do you recall that testimony?

A. Which volume is that?

Q. 49. I guess the concern is, from our point of view, that when the stakes at this hearing are a reliable supply of electricity, there is nothing that can be left to faith. I don't know whether you want to expand upon your comment, but we were just very concerned that that was indicative of your entire demand management program.

A. I believe what I was talking about here was sort of a context where, yes, there is not -- Ontario Hydro doesn't have a track record in terms of demand management programs and the results of the consultants studies and so on that we have seen to date aren't very ambitious targets relative to the results that have been seen.

I think the issue of faith is one in terms of if we plan to do it, we can do, and we will do it. It's matter of setting those targets and going out and making it happen. I don't think it is just that we are going to sit and wish and hope, to coin a Dusty Springfield song, that we are just going to sit around and wait for it to happen.

But in terms of setting the targets and how we looked at those targets and strung them out over the 10 years that we have been looking at, 11 years, I guess we started setting targets in '89, that how we would get from 1989 to the year 2000, and each of those steps in between. We weren't sure how big each of those steps might be. We have taken, I think, some giant steps in the early year and we are ahead of target, and I think we are going to keep on taking giant steps and bring the whole province along with us as we get energy efficiency.

So, I think that was really reflecting more of an attitude of enthusiasm and drive that is definitely evident in the demand management staff at Ontario Hydro.

Q. Does your answer really capture the nub of the matter when you said that Hydro has no track record? Is that really the problem here, or is that Hydro's venturing off into the wilderness on the most ambitious plan on the continent and yet you have got no track record to back it up?

...

[10:58 a.m.] A. Well, that's a reality. When we did anything for the first time we didn't have a track record and that applies to, you know, supply side in Ontario Hydro and other groups have been in the lead in doing a lot of things, and I don't think it should be unsettling for anybody to think that we're going to do the same on the demand side.

Q. Well, I guess the further concern is that you have eight years to achieve all that.

A. And so far we're tracking ahead of target.

Q. I would like to ask each member of the panel, recognizing that every panel member has a different area of expertise, what are their concerns about achieving the demand management targets that have been presented to this Board.

If I could start with you, Mr. MacLellan, for the residential side.

THE CHAIRMAN: What do you mean by concerns, I mean, that's a pretty broad statement.

MR. RODGER: Well, just to give some examples, Mr. Chairman. For example, Mr. Wilson said earlier in his testimony that we certainly don't expect every program to work perfectly, so presumably he can expand upon that, of where he sees the problem areas.

Mr. Burke, with respect to refrigerators and EEI estimates, talked about pushing our analysis a little bit beyond what has been economically demonstrated to be economic.

THE CHAIRMAN: Well, maybe the better way to do it would be to take those examples you've got and ask them, if you need to, any elaboration you want on that.

MR. RODGER: All right.

Q. Well, going back to you, Mr. MacLellan, I recall Ms. Mitchell when she talked about audits in residential properties and she said, I believe, that after a recommendation has been made to the customer that only about one third were actually implemented within the first year.

That's the kind of thing, the concerns that you have about the programs. Maybe you could expand upon that and incorporate other programs affecting your residential sector.

MR. MacLELLAN: A. I wouldn't describe that as a concern, I would describe it as program expectation, that the rate of pick-up of a program like that is what we base our program design on and our program targets on. We would be concerned if we launched a program like that expecting a one third

pick-up and only got 10 per cent.

It looks like from pilot programs that it's going to exceed one third. So it's not really a concern, it's something we expect.

If programs don't track according to expectations, then it's a bit of a concern. If the economy doesn't track according to expectation, an example of that I guess is the R2000 program. We launched a program and housing starts immediately collapsed. It was a real challenge to meet our targets in the midst of a major recession where housing starts were very, very low.

Now, we've done a number of things to the program and the economy is turning around, so assuming the economy tracks according to what is expected, again, it's not a concern, we'll adjust programs like that to mitigate some of those concerns.

The speed at which some of our allies, such as manufacturers, can come forward with technologies and products that are on the drawing board is something we're expecting and is an issue, but it's in their vested interest as well as ours so, again, it's something we expect to happen.

Q. The two that you mentioned, the economy and the manufacturers, those are external

concerns or external forces that could have an impact on Hydro achieving its goals?

A. External to Hydro, yes.

Q. Ms. Fraser, what about the commercial sector, do you see any problem areas that Mr. MacLellan has indicated?

MS. FRASER: A. I would have to say from the commercial perspective, given that the federal and provincial and municipal governments together account for probably somewhere between 30 and 40 per cent of the square footage in the commercial sector, that the degree to which policy statements which are set at the top of the house, so to speak, the federal government Green Plan, the new energy directions, the sort of testimony that we had from counsel for City of Toronto, that sometimes there's a gap between that policy statement and actually rinsing out all of the energy savings that we can get in the lights in the buildings and the HVAC systems and all sorts of things, and then changing the -- I guess, weeding out the barriers, institutional barriers that exist.

At this point those concerns are already reflected in our penetration rates, and I've talked a bit about that, and I'll be very happy if I can be proven wrong that those institutional barriers aren't

insurmountable in the next eight years.

But I think there are a lot of mechanisms and processes and procedural things that impact energy use in the public sector which the larger environment in which those decisions are made is much more important than even though, you know, I think energy is most important thing in the world lots of other people don't, and getting those sorts of institutional barriers out of the way, I think, is going to be certainly a concern in commercial, including the money, capital availability side of it.

Q. Would you categorize those, again, external matters as pretty major hurdles to overcome?

A. Yes, but, you know, we certainly do have the right policy direction at the top and it's a matter of working together and pushing those things through, and I think we have made a great start.

We, meaning the collective, in terms of the -- we're auditing all the provincial government buildings in the province, we're auditing all the unique City of Toronto buildings, we're auditing 1,300 buildings a year for the federal government in Ontario, and we're moving from that auditing mechanism into really a negotiated program at each level of government and so I'm optimistic, but right now I'm not betting

the farm on it.

Q. How about for the industrial sector?

A. I think in the industrial sector one of my concerns is that a common issue that we run up against is an assumption that we - we, I, being the industrial plant - have done all I can do to save energy and there's nothing left there to do.

And, again, I think there's lots of opportunities, and certainly our results to date have demonstrated that the largest saving that we have seen so far have come from the industrial sector.

So, I think we have talked a bit about the frustration that we have in terms of not having a complete assessment of the potential for industrial and, on the more practical side, on the more program implementation side, I think it's also overcoming and that, almost an information barrier in terms of an awareness and understanding of what the potential is and the fact that it's really an investment opportunity as opposed to an expenditure.

Q. Would constraint on capital also be another factor that is applicable to the industrial sector?

A. Yes, but that's why we have got incentives and financing plans, to overcome some of

those constraints.

Q. Mr. Burke, I want to come back -- or sorry, Mr. Wilson, I'll come back to you at the end. But, Mr. Harper, how about the rate design area?

MR. HARPER: A. I don't know whether I would call it a concern as much as just a recognition that whenever we've got involved in talking about rate structure changes or rate design changes, in the past it seems to take a fair amount of time to do that, and I think as you've evidenced in the discussions you've had with other panel members, time is not something that perhaps we have a lot of.

I guess the other thing is that this often tends to take some sort of a balancing act, there's not just - I think as Ms. Fraser was saying - there's not just one objective here, there are a number of objectives.

And one of the issues I guess with rates is, is whenever you change them, for every winner there's going to be a loser, and I think that's probably one of the reasons why it takes a long time to make changes.

Q. Can you give us an indication at this stage who the winners and losers are going to be in terms of what you're proposing for rates?

A. No. I think it's hard to say. At any particular change that you make you have certain winners and losers.

If I look at the proposals we went through in the 80s where we were trying to, say, introduce time-of-use rates, one of the winners just on the particular time-of-use aspect were the industrial users within Ontario, the municipal utilities, particularly northern utilities were a loser on that particularly aspect, even our own rural system, to some extent, was a loser on that particular aspect.

So, I think it depends on the particular change you're making and you're going to have winners and losers and, to some extent, I guess what we did on the rate reform was try and bundle a number of changes together that had countervailing impacts, if you want, so that when you finished the whole thing up nobody really lost a lot and, as a result, you got a package that was acceptable and achievable for what you were trying to achieve.

Q. Mr. Harper, maybe if you could just put a little meat on those bones. When you talk about losers, what does that mean to you?

A. I guess it means, in a sense, that when you -- if you have a fixed revenue requirement and

you have certain rates or set of rates that you're using and you're going to change that particular structure, then really what it means is some customers are going to end up paying more and some customers are going to end up paying less and, in total, you collect the same amount of money, and I guess that's how I was defining winners and losers, and I guess that's how people define it themselves when they look at their pocketbook.

I think you can look about principles and maybe in Toronto market value assessment sounds like a great idea, but one of the problems with obviously implementing it in Toronto is when people look at what their potential change in their tax bill is, some people see increases, some people see decreases, and that obviously influences where they're going to stand on that particular proposal, even if it sounds like a good idea in principle.

Q. If I could expand on the winners and losers, when you design rate programs, and some people can participate and benefit from them but other groups may be unable to take advantage of them but are still paying for them in the general revenue requirement, could that also be seen as a winners and losers scenario?

A. Not to the same extent in my mind, no. I think a good example of that is the interruptible program that we have right now whereby the rate discount reflects a percentage of avoided cost and, as a result, the customers who choose to participate in the program and can participate in the program benefit from the lower rate.

The customers who cannot participate benefit from the fact that what is being paid out in the rate discount is less than what the avoided costs are of having to build capacity if those customers had wanted firm power.

And so I think in that case you do get a win/win situation.

Q. Mr. Shalaby, how about from a system design point of view?

MR. SHALABY: A. This is sounding more and more like a psychoanalysis session here. What are you concerned about, tell me everything in your mind.

I think I indicated the considerations of incorporating the demand management program into an integrated plan is to continue incorporating flexibility, to keep other options open, and not to get into premature commitments of supply.

If demand is going to do the job, you've

got to watch it carefully, not pre-commit to supply too early; on the other hand, don't let the window of commitment pass. So, it's a delicate balancing act as well.

Q. Would you say that the recent redirection of the $240 million away from pre-engineering work, that's hampered that flexibility?

A. Yes.

Q. Mr. Burke?

A. The other concern I have, before you leave, is the obsession with the year 2000. To me the long term is well beyond that. To the year 2000 is really a short distance away in terms of our business and meeting requirements over the entire period of the plan we are putting forth should always be kept in mind and not just a particular year or a particular period. We have got to look into 2005 and 2010. In terms of our business, that is the relevant time frame to look at as well.

Q. Would it be fair to say then that this striving to meet this amount of savings by the year 2000, that's putting time pressure constraints which would also make for less flexibility?

MR. B. CAMPBELL: Well, just a minute. Just a minute.

Mr. Chairman, I have tried to restrain myself throughout this whole line of generalized inquiry, but I think at this point it is fair for me to object that this is a matter, which Mr. Shalaby is being asked, which is under active consideration by the corporation right now, how these matters all will be integrated together, we've repeatedly advised the Board, we're not in a position to answer these kinds of questions at this time, and we expect to be by the end of the year.

I think not only is it not the subject matter of this panel, but it's quite unfair to Mr. Shalaby to sit here and speculate when he knows full well that there is a great deal of work and consideration required to go into these matters and that that work is far, far from complete.

THE CHAIRMAN: I think you covered this earlier, this general question. It really is not directed to demand management programs, rather it's to the future availability of major supply.

MR. RODGER: All right. Well, unless Mr. Burke or Mr. Wilson has anything else to add, I can move on to another topic.

Q. I'm now on the fourth point of my outline which is demand management evaluation

techniques.

I think it's apparent from what we have talked about this morning that it's crucial that Hydro is able to evaluate the success of its demand management programs. I take it you would all agree with that?

MS. FRASER: A. Yes.

Q. Would you also agree that it's important - I know you've done this - to carry out any evaluation programs that you can before you introduce these programs into the marketplace?

Is my understanding correct?

A. Yes. In some cases it's important to test things before and as well to process evaluations as you are ongoing and then do impact evaluations after. You do all three, and we are planning to do all three.

Q. I wonder if you could turn to the third page of Exhibit 308, which is Interrogatory 4.24.80, which will be 261.48 I believe.

And in this interrogatory we asked you to describe various demand management program evaluations and, as part of your answer in the first paragraph you said that:

"Hydro does not yet have standard

methods for DM Program evaluations. However, a formal procedure to provide consistent evaluations across programs is currently in the planning stages."

I take that answer stems from the fact that we talked about earlier, is that there is really no track record on which to base it on, that these are all new and, in many cases, first-time programs that are being developed?

---EXHIBIT NO. 261.48: Interogatory No. 4.24.80.

MR. WILSON: Yes, that's in part. An additional reason is, is that in each sector there's a radically different set of considerations for evaluation, and I'm not confident that we will have anything other than a general guideline for evaluation. It probably is not possible to have standard methods.

MR. RODGER: Q. If you go down to the third paragraph in that answer, Hydro states that:

> "...net MW impacts will be estimated using a variety of technical and analytical tools...EE estimates are provided through engineering estimates derived from lab testing and load metering."

...

[12:15 p.m.] Could you tell me, what do you mean by engineering estimates?

MS. FRASER: A. Just so we are clear, and probably our grammatical construction of this sentence wasn't as good as it could have been. Engineering estimates derived from lab testing or load metering.

Q. I'm sorry, I missed that.

A. It's engineering estimates derived from lab testing, that's one thing. It's not engineering estimates from load metering.

Q. I see. Okay.

A. Load metering is when you have the real McCoy and you are not going through the engineering estimate process.

That can be as simple as we are going to replace a 40 watt fluorescent tube with a 32 fluorescent tube, that is a savings of 8 watts per tube. We have put in 60,000 tubes, eight times that is whatever, relative to load factor all the rest of those sorts of things.

We also do in our savings by design program, for example, we do computerized building energy simulations, which are then stamped and approved by the professional engineer, consulting engineer

involved in the building, the design. That basically at that time is an engineering estimate.

Obviously what you can't do when you are building a new building is build the old building that you would have and build the new building the way you want it built and then compare the two energy consumptions to see what it is.

In other cases, engineering estimates might be garnered from calculations and estimates of motor use, or whatever, and all sorts of things. But they are sort of specific.

We do a lot of load metering to determine impacts as well.

Q. With the engineering estimates, are those, in essence, controlled experiments to see how different technologies react? Would that be a good way to describe them?

A. The building energy simulation package that we used, load shaper, basically models the operation of the building under different design parameters. You can try different options, different insulation levels, different types of glazing on the windows, and that kind of thing. So, if that's what you mean by a control situation where comparing that to what we would say was the base case, that would be one

way in which we would do it, yes.

Q. Are there particular biases with using engineering estimates that are known?

A. In terms of the research that I have seen using the energy simulation packages, and I believe this research of was done by either the Electric Power Research Institute or Lawrence Berkeley labs, I am getting my California labs mixed up, and that basically they went through simulations having different engineers, using different packages, do different simulations on different buildings. Basically, you could say that everyone would get a different answer.

It's really an art form to do it, but it's something that...

What we have done with respect to savings by design program is used that one program as sort of a benchmark, so that we are not using -- there is probably 20 or 30 different building simulation models that are better or worse for different reasons. Some are simpler to use but they give you much more sort of rule of thumb kinds of things; some are a lot more difficult to use. But then it's a matter of inputs in terms of the outputs.

So, I would say there is a bias one way

or the other, and it's my understanding of that research was that there wasn't necessarily a bias.

Q. Because it's my understanding that one of the problems with engineering estimates and also with the building simulation is that, in a sense, it captures an artificial surrounding, that it doesn't take into account, for example, behaviour of consumers. Would you agree with that or is my understanding incorrect?

A. In terms of the building simulation you can put in different operating characteristics and things like that. What you are doing is comparing Case A to Case A prime, and those things are constant in both situations.

Now, if you are talking about issues in terms of, if the efficient light goes in and it gets used a lot differently than the incandescent light or the inefficient light, that is a whole different issue that really doesn't deal in terms of engineering estimates, it's not an issue with engineering estimates; it's an issue of predicting consumer behaviour which is a whole other realm of issues.

Q. Consumer behaviour wouldn't come into play with these particular techniques that you have just described?

A. No, because you would be making similar assumptions about behaviour for both the cases.

MR. MacLELLAN: A. We also check out some of the engineering estimates with field test, controlled experiments as you say. Take the example of a heat pump, it's fairly easy to sit down with your calculator and see what the btu output of a heat pump is versus an electrical resistance furnace and thereby compare the efficiencies of the two systems, but we didn't want to just leave it at that.

We also wanted to stick a bunch of heat pumps in a bunch of homes and monitor them to check out the data to ensure that the estimates that we made on a calculator were in fact what happens due to behavioural change.

Q. And did you say you have done that already?

A. We have, yes.

Q. Is this Espanola?

A. No.

Q. Would that come under that category?

A. No, that is a very different thing. That's more of a demonstration of how you can deliver maximum energy management through a specific marketing delivery method. The heat pump example I was

mentioning is where we took a number of heat pumps and put them in homes around Ontario and monitored them in a field trial over the last few years, to compare against the engineering estimates.

Q. So you have a control group that you are looking at that you don't put the heat pump into their homes, you have an experimental group, you put the heat pump in their homes and that gives you a comparison of what happens, what the savings are, is that what you mean?

A. No, not in that case. In that case we are comparing the performance of the heat pump in the homes where they are placed versus the estimates that we came up beforehand of what do we think people would say if we put a heat pump in their house.

There are other cases where we do a have a control group and an experimental group. In some of our load management trials that have gone over the last 10 years or so, we had that kind of a thing.

One of the good examples, I guess, is time-of-use rate experiments where we had a control group and experimental group and you compared and contrasted between the two.

Q. Let me ask you, Mr. MacLellan, what were the results of the studies that you did where you

have the engineering estimates and the real life situation? How did the engineering estimates shape up to what actually happened?

A. I don't have that number with me.

Q. Would that be possible to get that?

A. It should be possible. I can see what I can do.

MR. RODGER: Should we give that an undertaking number, Mr. Chairman.

THE CHAIRMAN: Yes.

THE REGISTRAR: 267.13.

THE CHAIRMAN: 267.13.

MR. RODGER: Thank you.

---UNDERTAKING NO. 267.13: Ontario Hydro undertakes to provide the results of the heat pump comparison of the engineering estimates versus what happened when the heat pumps were actually installed.

MR. RODGER: Q. Where did you carry out, Mr. MacLellan, the situation where you had the control group and experimental group? You said that was various locations around the province.

MR. MacLELLAN: A. Can I ask Mr. Harpur to help me out on that. Was that the time-of-use rate experiment?

MR. HARPER: A. I am sorry, were you referring to the time-of-use rate experiment or the

heat pump?

Q. Actually, the heat pump.

MR. MacLELLAN: A. I'm sorry. It was where we had a control group and experimental group I said it was a time-of-use rate experiment, and not heat pump.

Q. You haven't done it for heat pump.

A. Yes.

Q. I will ask you questions about the time-of-use rates in a second, Mr. Harper.

Did Hydro every consider using any of the funds that were redirected, that $240 million, to have that kind of experiment where you had a control group, an experiment group and using various aspects of the residential demand management initiatives? Was that ever considered?

A. I am trying to remember the list of things that were considered as potential for that.

I don't think so. As far as I remember, the programs put forward as potentially to come within that redirected money were actual delivery programs as opposed to research. The research is going on anyway. That is a little bit longer term planning for a couple of years from now.

Q. Do you have any results of what has

happened in other jurisdictions when they have done that type of experimentation, what the results have been?

A. I have seen it in the past. Are you talking about a specific technology or just generally or...

Q. For example, I believe it happened in California, the situation where they did just that. They had a group of homes, they put in a number of residential demand management features like ground source heat pump, new insulation, and so forth, and they compared that billing with the billing of the group that was the control group that were just left without any demand management measures, to measure those savings and measures the cost-effectiveness and so forth?

A. Well, as I say, I am aware it's going on but I don't know any details.

We do have a control group of sorts for the Espanola project. The Town of Sturgeon Falls is a town where it's essentially being left alone. It's not left alone entirely because it's subjected to our other demand management programs, but it's not receiving the same kind of intensive attention as Espanola is. So, in a year-and-a-half or so, we expect to be able to

compare the two groups.

Q. Okay. Mr. Harper, what happened with the --

MR. B. CAMPBELL: Just before we go on. I understand that the recent undertaking we took with as being with respect to the results of the heat pump comparison of the engineering estimates versus what happened when they were actually installed. Do I have that correctly? It's not this other that we are talking about.

MR. RODGER: You are correct, Mr. Campbell.

MR. B. CAMPBELL: Thank you.

Thank you, Mr. Chairman.

MR. RODGER: Q. Mr. Harper, what happened with the situation of the time-of-use rates when you did this experiment, what were the results?

MR. HARPER: A. I guess I can maybe explain. The time-of-use rate experiment was for residential customers and involved about 500 residential customers across the province.

In selecting that sample of 500, we picked them out of both municipal utilities and areas basically that Ontario Hydro served all across the province. There was an attempt to get an even

geographic distribution and also a fairly even distribution in terms of the types of end uses, be it space heating or water heating that the customers had.

It was real a control group in two senses of the word: One was all 500 customers were metered for a year prior to being put on time-of-use rates. Then when the experiment started, and the experiment lasted for five years, there were basically 17 different rate forms that were applied to the customers, basically testing different definitions of peak/off-peak ratios, different definitions of time-of-use periods.

Three of those 17 rates forms had no time-of-use feature to them, so that was another way that we did control in terms of seeing how customers would perform under time-of-use rates as opposed to being on regular rates.

We haven't wrapped up the final analysis of the experiment yet, but I think it is fair to say that based on the types of residential time-of-use rates that we would see flowing through to residential customers based on the wholesale time-of-use rates we are charging utilities, if I take the results out of the experiment that more closely related those types of rates, the shift from winter peak to winter off-peak

was about 5 per cent of the customer's use.

Q. What time period did this take place?

A. The experiment started in October of 1982, so the first year everybody was on just regular rates and they are being metered to see basically what they used without being on time-of-use at all, then the customers were on time-of-use rates themselves from October '83 through to October of 1988.

Q. You said that the results are not yet in?

A. We have been trying to model this using a couple of different models. I am virtually certain we have filed a report using one of the models within the hearing here. I could probably find, either the interrogatory reference for you, or if not, we could provide the report. So, we have done the analysis using one model.

We have been trying analyze the data using another model specification to make sure that basically the number we come up with in terms of the 5 per cent shift is fairly robust. I think it is comparable to Mr. Burke, when he is doing load forecasting he doesn't rely on just one model; he uses a couple of models to basically test those results. That's the same sort of thing we are trying to do here

with this experiment.

Q. So, with this experiment we are really talking about a six or seven year period in order to put the program in place and to collect the results and analyze it. It's quite a lengthy time period involved to get those results, I take it.

A. Well, I think the issue of analyzing the results is in part a factor of the level of detail we are going to in analyzing the data. We have been basically collecting data on those customers using 15 minute intervals throughout the entire year for all five years, so you have got a fairly good wealth of data. It also means you have a lot of data that you have to check and process.

If you are actually going to apply time-of-use rates to those customers, you wouldn't use that level of sophistication in terms of meter, and you wouldn't want to collect that level of detail on those customers. You would probably just in each month want to collect, how much did they use in the peak period and how much did they use in the off-peak period.

So, I think there is a fair difference in terms of implementing the experiment and analyzing the results between that and what you would do in a real time-of-use program.

Q. Okay. Just before we leave the engineering estimates, do I understand that these estimates, they must be based on some kind of formula, some kind of equations; is that correct?

MR. MacLELLAN: A. It all depends on the product or technology you are talking about.

Q. So for each different technology there would be a different equation that will be used for the engineering estimate?

A. Yes, different method of estimating.

Q. Maybe this is the reason why it's not in the plan. But I couldn't find anywhere those equations set out that were used by Hydro. Have I overlooked that, or have they not be been presented in this part of the evidence?

MR. BURKE: A. I think, for instance, if you were looking at the potential estimates, we have indicated which models we use in the background documents. Hot 2000, for instance, for residential modelling, the PRISM approach, and so on, they are all listed in the background reports to the residential estimates.

We haven't given the models per se, but the use of the models and the name of the model are usually indicated and also the extent to which we check

the model results.

Q. Okay. Ms. Fraser, when you described the lab testing and load metering, is that testing and metering done strictly within Hydro or do you farm that work out to consultants to do that?

MS. FRASER: A. We do both.

Q. Is there a known error factor in those load metering and lab testing procedures?

A. Not to my knowledge, but this isn't my area of expertise.

Q. Can anybody else provide the information on that point, or am I asking the wrong panel?

A. You are dealing with very technical issues.

Q. I will leave it for now.

Actually, one final point on engineering analysis. Do you know the results of what has been done elsewhere in terms of having a real life situation and having your engineering analysis -- the information that, Mr. MacLellan, you are going to get for me, have you looked at other jurisdictions that do that and what their results have been?

MR. MacLELLAN: A. During program design we try to collect as much information as possible on

programs, if there are any, similar to what we plan to introduce. That would certainly be part of it. I can't come up with a specific example right now though.

Q. All right.

MS. FRASER: A. There is a lot of work down by the Electric Power Research Institute, Lawrence Berkeley Labs, Pacific Northwest Laboratories, Bonneville Power Administration. Pacific Northwest in particular has been scrutinized greatly by both of those -- at least two of those groups, a number of different programs, the Hood River experiment and their audit program comparing the use of standards versus the use of incentive programs, and things like.

Q. So it sounds like there is a good deal of knowledge out there.

A. There is a wealth of it. It's not something that is sort of, here is the definitive study in ten pages. It's a lot of slugging through proceedings and conferences and papers and reports and that kind of thing, and Mr. MacLellan indicated we usually do that on a program by program basis.

...

[12:38 p.m.] Q. Okay, thank you. Now, returning to 261.48, in the second paragraph of Hydro's response, you say that:

"Future evaluations will include two parts. First, specific market-related issues, of relevance to program designers, will be addressed through traditional market research techniques."

Could you give me examples of what you mean by specific market-related issues?

A. We've done I guess three different market research projects with respect to the lighting program which we launched in 1989. We did some research to determine awareness of the program, interest in the program, that kind of thing.

We did research with the lighting manufacturers, contractors, what we call the allies, to see how they viewed the program, and then we did some research with actual participants in the program to determine how they felt about the process of applying for an incentive and how they felt about the results that they achieved.

And so it's those sorts of things on the market side of it.

Q. These have yet to be undertaken by

Hydro since the --

A. No, we've completed all three of those.

Q. Oh, you've done those. I see.

A. For the lighting program, we've done one on savings by design, there's a whole host of them, residential. These are filed in the Registry of Customer Research which is attached to a number of interrogatories, including 4.12.73 which we discussed yesterday.

It's a fairly thick document, I'm not sure if it was ever filed to an AMPCO response, but...

MR. MacLELLAN: A. I would like to add as well that we don't wait until the program is over before we evaluate it.

Evaluation is a part of program design as well; either market research to estimate the readiness of the market for a certain technology, or frequently evaluation of pilot programs.

For example, before we ran the April showers showerhead program early in 1980 we ran three pilot tests and ran consumer market research on all three sites to refine the program that would eventually be province wide. So, evaluation is done at a number of stages.

I get the impression that you think you wait until the program ends and then you evaluate it. You do it at design stage, you do it at pilot stage, you do it during the program, if it's a multi-year program, and then there is post-program evaluation as well.

Q. Can you give me a sense at what stage. When you're doing these ongoing evaluations. You just say this particular program isn't working, we're going to drop it, incorporate another one, or does that change from program to program, from sector to sector?

A. It does. It's very specific.

Q. To date, with your ongoing evaluations, have you dropped any programs?

MS. FRASER: A. I can give you an example where we were considering dropping it, but we changed the incentive level and it's a good thing we didn't drop it because we are now getting great uptake.

This is occupancy sensors for hotel and motel rooms. We originally put the incentive at $50 a unit based on our assumptions with respect to the U.S. data that the units were installed at a cost of $250. These units basically control the heating and cooling systems in -- you know, those ones that make a lot of

noise when you're trying to sleep in a hotel room, those. Anyway, it turns them on and off and it will set back the temperature if the room is unoccupied.

We put that program on the street, there was some interest, some work was being done and, you know, we had to put some test installations in some places to try and get it sold, and it turned out that the installed costs weren't $250 as we had based on U.S. experience, they were closer to $450, so the $50 incentive was really a drop in the bucket and it wasn't bringing the payback down to a range that was acceptable to the hospitality market.

We tripled that incentive to $150 - it's all still cost-effective under the total customer cost test - and our target market for that program was 11,000 hotel and motel rooms which are electrically heated and used year round, and we now have, I believe, over 4,000 either committed or approved or installed of that 11,000 and that's just in the last -- we increased the incentive in October of last year.

So we have seen that program, you know, turn right around as a result. We virtually had any installations before that, and the program had been on the street for about a year.

And we were certainly giving serious

consideration to dropping it, but once we understood the reason and analyzed the differences and looked at the issues, so now it's turned into a success.

Q. I take it that that year time period when you first introduced it until you made the decision, let's increase the incentive, that time period as well would vary from program to program, sector to sector?

A. Yes, it would depend on what we expected the uptake to be. We didn't launch the program with a lot of fanfare, it was really a program that we intended to use with hotel/motel operators to, you know, move them - we had started with our showerheads - and move them through, you know, occupancy sensors. We really wanted to demonstrate to them that we understood one of their prime needs in the hospitality market, and that's the comfort of their guests, and an occupancy sensor -- rather than just saying, gee, turn your thermostats down or put a limiter on your heating and cooling systems, you know, there's technology now that can make sure it's set back if it's unoccupied, but if it's occupied then it's -- the guests have complete comfort in terms of climate control.

And so we wanted to get that idea through

to the hospitality industry, that we understood that it wasn't just their energy needs that we were respecting, it was their business needs as well.

And so we didn't expect that program to instantly take off but we were getting kind of anxious as the months wore on and we had got interest and sort of nibbles but we hadn't had anyone to bite, and now we've got whole hotels.

The Harbour Castle Hilton has just finished its south tower and we'll do the north tower next, so that's over a thousand rooms right there.

Q. Thank you. Staying with that interrogatory, 261.48, you state in your answer that:

> "...the net MW impacts will be estimated using a variety of technical and analytical tools."

I wonder if you could describe what these technical and analytical tools are?

MR. WILSON: A. They range from using specific monitoring of the energy consumption of particular pieces of equipment or buildings or power circuits within buildings that provides a specific evidence of a usage pattern in energy consumption of individual pieces of equipment.

Backing up from that, because that's very

expensive at the one end of the spectrum, backing up from there to basically the customer's meter to analyse the electricity demand over time, compare that with previous periods and where such comparisons can be drawn, make adjustments for changes in economic level, occupancy level, the building, weather and so on, to establish a reasonable feel for what's gone on.

At the far end of the spectrum, certainly the cheapest of net impact evaluation is simply to determine if the equipment has actually been installed and continues to be in use, and that's just a physical -- are the efficient motors that we paid an incentive for still on the premises and have the lights been changed back from what we thought was installed to something else.

So there are quite a wide range, and clearly you have to balance the cost of evaluation with the benefit of conducting the evaluation.

Q. And just to give an indication of where you would actually use that range of options, for monitoring specific equipment, where have you done that to date?

MR. FRASER: A. We developed a product called the ERA, electronic recording ammeter, which is basically a portable meter which we can go in and tap

in and we use it to -- in the accelerated payback program, for example, in terms of before and after, if you make a process change or a system change, a variable speed drive application or something similar to that, and basically this meter will give you a reading of the consumption and the demand before and after and you can, you know, set that kind of metering scheme up.

And we've done a lot of metering projects for a lot of large customers really to determine the point of use consumption of particular equipment or particular processes or particular lines in a production factory or whatever.

Q. So I take it then that's the industrial sector that this has been --

A. That's sort of the easiest example to give you. We have done metering of ground source heat pump installations in commercial, similar to what Mr. MacLellan was talking about. You know, we use those things both for evaluations like this, but also for developed case studies to advise other customers on the benefits and we showcase those in publications like Initiatives in Payback and Electric Options, and so on.

Q. So I take it that the monitoring of specific equipment is for the large customers, perhaps

large industries or large commercial customers, and at the other end of the scale doing the site visits to make sure that equipment is installed and so forth, that would be applicable amongst all three sectors.

MR. WILSON: A. Yes, it is.

Q. Thank you. Staying again with 261.48, in the first paragraph while you say that:

"Hydro does not yet have standard methods for DM program evaluations...a formal procedure to provide consistent evaluations across programs is currently in the planning stages."

When do you anticipate that that will be completed?

A. I think that we will probably have that completed over the next few months.

Q. Few months. Now, we've heard from Hydro that over the years it's had a number of conservation programs in place which I suppose today would fall under the banner of demand management and, likewise in the U.S. they have a decade or more of demand management programs that they've put in place.

But I understand that there still remains a problem of having reliable sources of data, notwithstanding the track record particularly of the

States, and that was what I took from questioning of the Coalition of Environmental Groups when they were asking about data and reliable data.

THE CHAIRMAN: Data with respect to what? I perhaps missed that.

MR. RODGER: With respect to having a reliable source of data about what these demand management programs have achieved.

THE CHAIRMAN: Performance data.

MR. RODGER: Yes, performance data, acceptance, so forth.

Q. Is that correct?

MR. WILSON: A. We talked with the Coalition about the difficulties in making comparisons between different U.S. states and utilities' operations and our own.

And among those are different approaches to keeping score. Some utilities count the number of participants in a program and treat that as a penetration rate; others count the pieces of equipment that are sold, not the number of customers, but they'll characterize that as a participation rate; others do what we're attempting to do, which is to relate what's been accomplished in kilowatthour terms or megawatt terms to the potential and treat that as a penetration.

So when someone says: Well, I've got a 40 per cent penetration rate, what did you get? You have to dig a lot deeper.

Q. I see. So it's not necessarily a problem of having reliable date, it's a problem of comparing apples to apples?

A. That's correct.

Q. Maybe I can go through one quick point before the lunch break. I took from your evidence that Hydro assumes linear extrapolation of potential induced EEI in new market applications; is that correct?

Actually you might want to refer to page 4 of Exhibit 308, it's Interrogatory 4.24.52 and that now becomes 261.49.

---EXHIBIT NO. 261.49: Interrogatory No. 4.24.52.

THE REGISTRAR: 261.49.

MR. RODGER: Yes.

Q. And we asked you this:

"EEI savings after 2008 appear to be based on a linear extrapolation of the year 2000 and 2008 estimates realistic."

It's worded a bit poorly. Then we asked:

"Please provide any study performed to support the linear extrapolation of

the EEI potential according to the load growth?"

And in your second paragraph you state that:

"There is no formal study specifically on the validity of the linear extrapolation of potential induced...(EEI) to the year 2014."

And I guess my question is: What are your assumptions or how can you assume this linear extrapolation?

I guess specifically, isn't it just too early to make this kind of assumption; aren't we just too early into the process for you to assume that?

MR. BURKE: A. Well, I guess the problem I'm having difficulty with is I'm not -- having not been personally involved in this particular response the meaning of linear extrapolation -- if what is being linearly extrapolated is the amount of EEI potential per house, per unit, if that's what's linear, then that's not a very strong assumption, but...

Q. If you want to have the lunch hour to think about that, I would be happy to --

A. Sure. My offhand reaction - I would like the lunch hour - is that for the period 2008 to

2014 the consequences of making different assumptions about this are probably pretty small.

But if there's a substantive point to the choice of linear extrapolation as opposed to the way we've actually been doing it prior to 2008, I'll try and be briefed on that over lunch.

MR. RODGER: Thank you. Would you like to take the break now, Mr. Chairman?

THE CHAIRMAN: All right. We will break until 2:30.

THE REGISTRAR: Hearing will adjourn. until 2:30.

---Luncheon recess at 12:58 p.m.

...

---On resuming at 2:35 p.m.

THE REGISTRAR: Please come to order. The hearing is now in session. Please he be seated.

THE CHAIRMAN: Mr. Campbell?

MR. B. CAMPBELL: Thank you, Mr. Chairman. I am just doing my usual duty and reporting that Undertaking No. 267.10 has been filed.

THE CHAIRMAN: Thank you.

Mr. Rodger?

MR. RODGER: Thank you, Mr. Chairman.

Q. Before the break we were discussing Exhibit 261.49, and in particular, the assumption of Ontario Hydro that the average annual gain and potential induced EEI in megawatts will be the same in the period 2008 to 2014 as in the period from 2000 to 2008. I was asking Mr. Burke what premise the assumption of linear extrapolation was based on?

MR. BURKE: A. The reason I was balking in giving the answer at the time was it was not my understanding that that's the way still did that. And given that that is what it said in the interrogatory response, I was hesitant to override what was written down. But that was the approach taken in Exhibit 25. And in Exhibit 76 the approach was improved, shall we say, to be consistent with the way we handle new market

at any time during the period; that is, the eligible stock is based on the projection from the load forecast for that market segment, and the efficiency gain is taken as the same efficiency gain as applies to any year beyond the year 2000 for that market segment.

So that the profile of potential induced EEI in new market applications reflects the profile of the load forecast for that end use right through to 2015.

Q. I see. So whereas the answer to this interrogatory, that assumption kind of assumed a constant growth rate. Under your analysis now you recognize that the gains are going to peak out at some point.

A. Well, the efficiency gains for any increment in load remain the same. That's a simplifying assumption on our part. We could have assumed that they would increase or decrease, but in fact we have assumed they remain the same beyond the year 2000.

What changes is the annual increment in load. For instance, if we are talking about residential space heating load, it's quite likely that the annual increment in that segment -- the growth in that may be slowing down because of demographics

beyond 2008, and that would be reflected in that the same proportion of saving would be applied to a smaller increment in the load forecast for that segment.

Q. So, we should just disregard the assumption in this interrogatory from here on in.

A. Yes. It was relevant for Exhibit 25 but it has been superseded in the way that Exhibit 76 was undertaken. And there are various elements of the text of Exhibit 76 in discussing how the potential was derived beyond the 2000 that allude to this, although it's not as explicit as my description right now.

Q. Okay. Thank you.

If I could ask you to turn to page 4 of Exhibit 308. This is AMPCO interrogatory -- I'm sorry, page 5 of Exhibit 308, Interrogatory 4.24.83, which is now 261.50.

---EXHIBIT NO. 261.50: Interrogatory No. 4.24.83.

MR. RODGER: Q. In this interrogatory we were asking you about behaviour related factors involved in EEI technologies and the estimates of EEI technologies. I take it that two major behavioural factors that should be considered are the snapback effect and the effect of free riders; is that correct?

MS. FRASER: A. Free riders is certainly something that we explicitly deal with in both program

design and program evaluation in determining the net impact.

The snapback effect, the information we have from consultants in the U.S. and I guess our own research, has shown that that's not a very material issue. It's something that we are certainly watching for.

Q. Okay. Perhaps with respect to free riders, I will come back to that later on. That's part of the information I am waiting to receive.

THE CHAIRMAN: Perhaps, Mr. Rodger, you could explain what you mean snapback to mean.

MR. RODGER: Okay.

Q. I understand it to mean that there is a change, an increase in the energy use as a result of putting in a demand management retrofit. For example, you put in a high efficiency air conditioning system, there might be more opening of the blinds in a home and therefore you would use that air conditioning more often. So the result is an increase of energy use and it is caused by the new demand management measure.

Is that a fair understanding of snapback effect, Ms. Fraser?

MS. FRASER: A. I guess I was taking it to mean similar to what we talked about with the first

Mr. Poch in terms of rebound, and we dealt with it more than at the -- the only reason that they would use more energy, or would use their system more often, would be if it was an income effect, and Mr. Burke described this quite a bit. But basically our interpretation was in fact, that that wouldn't the first place they would spend their extra dollar of income as a result of the efficiency savings.

Q. At the very last paragraph of the answer to the Interrogatory 261.50 --

MR. BURKE: A. Can I just clarify that the snapback effect itself is not something that actually increases the amount of energy used. I think it is usually understood to reduce the amount of savings anticipated because there is a certain takeback by the customer of the savings through greater use, but it doesn't end up with a net increase at all in the amount of energy used.

Q. So the effect is to reduce savings?

A. Yes, to reduce the amount of savings.

Q. Okay. The last paragraph on the answer to that interrogatory, you state that:

> Snapback effects and system oversizing effects depend on the program design. Due to lack of information, there is no

quantification of these effects.

Has your position changed with respect to looking at this effect?

MR. MacLELLAN: A. That doesn't say we don't consider it. When we can, we take it into account by measuring the use before an energy-efficient measure and the use after.

Probably the simplest example of this kind of an effect is with an energy efficient showerhead. When you install an energy efficient showerhead that has a flow rate of 2.5 gallons per minute or less, versus a 4 gallon per minute unit that you have replaced, there is the hypothesis that what will result is a longer shower.

So, while you will still save a fair bit of energy because it's a lower flow, you will take a slightly longer shower, so as a result the savings won't be as much as you would think they were if you just calculated it on a piece of paper.

To get around that kind of an impact in a program like our showerhead program, we didn't rely on a simple -- this many gallons of water for one shower and this many fewer for another. We did some tests of buildings, two entire multi-res buildings, one with and one without these energy-efficient showerheads, and

compared the real results.

So as not to indicate to you that we don't consider snapback effect, when we can, when it is possible, we incorporate it into the results we take in our program.

Q. And that's important, I put to you, because if the result of the snapback effect is to reduce savings, that means that your savings you are planning for are being overestimated unless you do look at that and take it into account; is that correct?

A. That's correct. But as was stated, that's not considered to be in any material amount usually.

Q. As I say, I will leave my questions on free riders for now.

Now, staying with Interrogatory 261.50, I take it that another impact evaluation method should address another operation related factor such as system interaction effects, and that's described in the second last paragraph in Hydro's response to that interrogatory. Perhaps you could describe, first of all, what system interaction effects are?

MR. BURKE: A. Well, in estimating the commercial sector potential induced, the methodology took into account the interaction between reduced

lighting and the requirement for air conditioning in the buildings, and that's an interaction effect. It's part of viewing the building as an entire energy system.

Similarly, when we were analyzing individual space heating measures, they were done in a complete house simulation for the residential potential.

Q. When looking at the interactive effects, did Hydro consider interactions between non-lighting end-use technologies? To give you an example, if you have efficient lighting that generally emits less heat than standard lighting, the lost heat has to be made up somewhere. That's what I understand the interactive effects to be. I wonder whether that was taken into account for the non.

A. In the commercial sector we did not explicitly take that into account because of the fairly low market share of electric space heating in the buildings where most of the lighting measures were being installed; that is, in the office sector. In the retail sector, electric space heating market share is relatively low, something less than something 10 per cent.

So, that in fact the heat that is made up

is usually made up through increased use of natural gas, and we did simplify the analysis by excluding the small portion that would be made up through additional electrical heat.

Q. So, if our primary goal as we talked about earlier on this morning about overall energy savings, could you say, for example, in the case of the commercial sector that that increased use of natural gas is going to achieve that overall goal of lower energy consumption?

A. Yes. I think the sort of relationship that I understand exists between changes in lighting load and changes in space conditioning requirements is of the order of a 10 per cent effect. That is, if you reduce your lighting load by a certain amount, then the impact on the heating system is 10 per cent of the reduction in the lighting load. It's a fairly small effect. And the increment to the heating system requirements using natural gas would be efficient in that sense. It would be efficient to use natural gas for space heating as opposed to effectively heating the building through the lights, electrically.

Q. Could you please turn to page 15 of Exhibit 308, which is Interrogatory 4.24.11, which now becomes 261.51.

---EXHIBIT NO. 261.51: Interrogatory 4.24.11.

MR. RODGER: Q. In this question we ask you to provide the planned annual EEI expenditures in 1991 dollars for the period 1991 to 1996, broken down as follows, and first one was Ontario Hydro's OM&A costs for incentives and other by market sector.

In the response, Hydro states that:

> OM&A and capital spending by market sector at Hydro is available for the complete energy management function. This includes all costs related to energy management and is not restricted to EEI. So it includes cost for all your programs, load shifting, discount demand service, program support, and so forth.

This being the case, we were wondering how it is possible for Hydro to know specifically how much it is costing to achieve EEI savings in each of three market sectors if you don't break it down into individual programs. Our concern here is, how is it possible for Hydro to track what are the most cost-effective programs and therefore deploy the resources accordingly?

MS. FRASER: A. In order to do the total customer cost test we do it on a program by program

basis. And that's specific to the objectives and all the rest of it. The data with respect to those programs is all in the PCRD with respect to the costs.

The business plan and the numbers represented in this interrogatory are those for the whole function. Some costs can't be separated in terms -- on an accounting basis. They can in an estimation basis for programs. But on an accounting basis if a field representative, for example, visits a large mining establishment in Northern Ontario, they may be discussing customer service issues, they may be discussing load shifting through time-of-use rates or through the loafed shifting program, they may be discussing the motors program, lighting program and so on.

It's not material or statistically significant for them to breakdown their two hour visit into a whole bunch of different accounts. So we don't budget fully in that way.

We are moving towards budgeting on a program by program basis to be able to do those kinds of costs that will capture probably about 95 per cent of the costs, and we will be able to do. But basically for the cost-effectiveness tests, those are based on specific program estimate costs.

Q. This new type of analysis, you say this is being worked upon, but it's not in place today?

A. In the midst of developing a whole new budgeting system for energy management that hopefully will be a little more helpful than the current one we have, which has sort of been outgrown.

Q. And what kind of time frame is Hydro looking at before that new before that new system is in place?

A. I believe it's supposed to be in place by next year.

Q. I would like to move to a new section which is market penetration. If you could turn, please, to page 4 of Exhibit 304, and this is a reference once again to Exhibit 24, which is the RCG/Hagler study, Ontario Hydro's demand management Targets.

I would like to read part of this excerpt, the top two paragraphs, this is again under the heading of "Lessons Learned - Implications for Hydro".

> "Hydro's overall targets are ambitious both in relative and absolute terms, especially for the year 2000. Only three to five North American utilities have

targets of comparable magnitude.

These savings are also programed to occur over a fairly compressed time period: Many of the utilities which have 1995 targets comparable to Hydro have been active in demand management for some time. As such, they have gained customer and market knowledge, pre-established third party alliances and developed the logistics of program delivery which will help expedite their new initiatives. Hydro has a more limited experience based to tap, but is certainly not starting at "ground zero". It, too, has developed effective third-party alliances, but its field organization has never been charged with the task of implementing simultaneous programs this large in number in encompassing in scope and diversity."

Over at the next page, which is page 97 of Exhibit 24, second last paragraph:

"For any given sector or specific program, Hydro's targets appear reasonable relative to sector size and

contribution to peak demand. However, in order to achieve its overall goals, Hydro must simultaneously deploy a fairly larger number of programs, each of which must meet its targets if overall system targets are to be realized.

Many utilities report dramatic program failures (e.g. programs with two to four per cent participation by eligible customers); few report significant "overachievers"."

Can you tell me how you have used this information from this independent consultant's report, how you have incorporated that into your demand management initiatives?

...

[2:58 p.m.] MR. MacLELLAN: A. One of the ways we have done it is to, instead of working solely through field staff, we've worked through other groups of allies.

For example, the heat pump program is essentially delivered by heat pump contractors; the R2000 program is effectively delivered through R2000 builders; a lot of our retail products sales programs are delivered through the retail market.

So in that respect we're not relying on, solely on, field staff to deliver programs, not relying solely on our own infrastructure, whether existing or new.

Q. Using these different allies, does that also address the concern of the savings of the programs are programmed over a fairly compressed time period that the RCG/Hagler study talks about?

A. We still consider the targets reasonable.

MR. BURKE: A. Increasingly as we get more sophisticated in our treatment of penetration rates, the penetration rate numbers that occur in Exhibit 76, for instance, represent averages over the decade, and we are building profiles for those penetration rates.

So we recognize that in the early years penetration rates will not be as high as later on and program design will have to address ways of achieving the penetration rates by the end of the decade that are required to make the average come through.

Q. Now, this report, one of the sections I just read talked about a comparison of programs in the States with Ontario Hydro's program, and there was some discussion earlier on about how that kind of comparison may not necessarily be appropriate given differences among different systems.

Could I ask you: Are you aware of the various efforts over the years which have been sponsored by the Canadian federal government and the Ontario provincial government for various conservation-type programs which today we would probably include within the umbrella of demand management; for example, window programs, insulation programs, and so forth?

MR. MacLELLAN: A. We're aware of them. I don't know that there was a window program, but there certainly have been insulation programs, off-oil programs, things like that.

Q. When you look at other utilities' demand management programs, has there ever been any

kind of analysis done with respect to those programs on a federal and provincial basis, how that stacks up to what governments in other jurisdictions have done as a comparison?

And maybe I need to flush this out a bit more so you can see where I'm going. Mr. Rosenberg said in his cross-examination how, in Ontario, we were conservers and he referred to a survey.

And my concern is, is that if previous programs sponsored by the federal and provincial governments, if they have taken Ontario along the conservation road a ways to date, is Hydro's demand management plan that much more ambitious than those other jurisdictions which hasn't had those programs in the past, because we may have already made a certain amount of gains in conservation and, thus, it may be more difficult for Hydro to achieve even further gains as opposed to a jurisdiction elsewhere which really is starting from ground zero and can make fairly easy inroads in some areas. That's the concern I'm worried about.

MR. BURKE: A. Well, I don't know whether it helps you but, for instance, in the residential sector where most of the federal programs have been directed, when we've estimated potential

induced using the 1,000 home study that we undertook over the last two or three years we clearly have found out the extent to which homes have already been upgraded, and that has actually diminished in many cases. The potential for certain measures, certainly attic insulation is something, the potential for which, is less than we might have thought a few years ago because of the amount that has been already undertaken through the programs such as CHIP and, as a result, our potential estimates in that one area may be lower than we might have said a few years ago.

But it's already taken into account in Exhibit 76; that is, we feel we have a pretty good handle on what the impact of previous programs has been, we're now only looking at economic measures that remain and, in many cases if, as we found, there's a very significant portion of housing stock that had already insulation above R35 in the attic for instance, there's almost nothing that you can do economically to the attic of a house incrementally to take it beyond R35.

But, as I say, that has been factored into the analysis that is contained in Exhibit 76.

Q. Has that specific comparison been looked at in terms of how far along the conservation

road Ontario is compared to, let's say, New York or California or some of these other studies that we've been talking about and comparing the Hydro plan to?

MR. MacLELLAN: A. I'm not sure that comparison is necessary for program design. We're not starting from an assumption of what the housing stock looks like, we're starting from fairly concrete knowledge based on the 1,000 home survey of what the housing stock is, and that's where the estimates of potential come from, then the estimate of how much can be achieved economically is developed.

So we have looked at the level of standards and building codes and elements like that in other jurisdictions, but I'm not sure that comparison is necessary to estimate potential or to design programs.

Q. Okay. Could you turn to page 6 in Exhibit 308, Interrogatory 4.24.51, which is 261.51.

MR. B. CAMPBELL: 52.

THE CHAIRMAN: 52.

MR. RODGER: I'm sorry, 52.

THE CHAIRMAN: Sorry, Mr. Rodger, what number was that, please?

MR. RODGER: It's page 6 of Exhibit 308 which is Interrogatory 4.24.51. I understand that to

be 261.52.

---EXHIBIT NO. 261.52: Interrogatory No. 4.24.51.

THE CHAIRMAN: Thank you.

MR. RODGER: Q. And the essence of our question here was, what happens after the lifetime of one specific demand management initiative ends, what's going to happen, and the question:

> "The EEI impacts assume that efficiency improvements will perpetuate after one lifetime of the equipment."

I understand that Hydro assumes that after the first lifetime of the equipment, the customers will take it, they will take the initiative to continue on with that demand management measure.

And the response to that question as stated on the interrogatory is that:

> "Hydro does not yet have adequate program history to substantiate the assumption. Hydro is not aware of any studies done by other utilities examining this issue."

I'm wondering, first of all, how do you substantiate this assumption that people will continue with this behaviour?

MR. BURKE: A. Well, maybe I'll answer

from a theoretical perspective in the sense of how we did the analysis of long-term potential first.

It is economic to go in and replace the second time; that is, the lifecycle cost analysis, it would be economic for us to actually go back to each of the houses, each of the buildings and redo the measure a second time. That's the way the lifecycle cost analysis works.

The unit costs over 12 years, if something lasts 12 years, are economic and it's economic to go back and do the same thing again.

I think it's only a matter of: Can we avoid having to go back a second time because customers will, in fact, either replicate or further upgrade what they're doing at the end of the life of that piece of equipment.

But I think it's important to realize that that doesn't affect what is economically part of the potential, that if we had to, it is cost-effective to go back and revisit.

We may not have to even, but the worse that can happen, from the point of view of these programs, is that we would, in fact, have to undertake a second visit at the end of the life of the measure. It's not that suddenly the economics have changed and

we've made some assumption that somehow we're getting 24 years' worth of savings for the price of 12 years' worth of savings.

The analysis has been done assuming that the costs are incurred repeatedly. They're unit costs, that's what has to pass the test against the avoided unit costs. They're not costs for 12 years against savings for 25 years. That distinction is something I think it's important to recognize.

Q. Well, If I could perhaps give a rather mundane example. Where I see the uncertainty, a consumer goes out and he buys an efficient light bulb at Loblaws at whatever the price is, $13 or whatever, takes it home, uses it, after a period of time the bulb burns out, he goes back to the store and he doesn't buy another high efficiency light the next time, he buys the regular type, the non-efficient. That's the type of uncertainty that I'm wondering about.

Aren't you assuming that that same customer is going to back time after time after time and by the high-efficiency bulb?

MR. MacLELLAN: A. Your question is very much a concern to us during program design. In the residential market what that means is we have to hit various points in the distribution channel, we have to

convince the consumer of the merits of the product, we have to convince the retailer to stock it, and we have to convince the manufacturer to produce it and price it reasonably.

In one real life example where we do have some program history where the data just came in about a week ago actually, certainly since this interrogatory, is again the case of showerheads.

Energy-efficient showerheads were quite a small component of the retail marketplace and, therefore, a small component of sales two years ago.

We ran the program last spring and sales tripled for the program period year over year. We were quite happy with that sales result, but the lingering concern was: What would happen for the rest of the year, did that essentially just move forward sales from September back into April, or did it actually do something to the market.

Our attempt was to change that market to one where low flow showerheads would be a much bigger part, and we have just got the data in about a week ago to say that since that showerhead program sales of energy-efficient showerheads have stayed at that level and that in spring of 1991, even though there was no April showers program, the sales met or, at some times,

even exceeded that heightened level of the previous year, and we actually have letters on file from a couple of manufacturers who say that the Hydro program was responsible for radically changing that market.

That's the type of impact we try to consider during program design. It frequently requires that we establish some sort of critical mass or we get people used to stocking a product because, I mean, I agree with you on your light bulb example, we have to make sure the customer is happy with the bulb during the life of that product, we have to make sure it's very available, preferably at a cheaper price when he goes back in to buy again. In the light bulb case, that's going to be five years hence, but still we need to continue working in that market.

Q. So certainly at this stage then it's very uncertain that you're going to be able to change the market in those ways as we sit here today?

A. Well, it's uncertain but it's something that we're certainly aiming to do and it's something that we have a concrete example that we've been able to do.

MS. FRASER: A. We're seeing a similar effect in high-efficiency motors. Prior to our program high-efficiency motors weren't stocked by distributors,

so they weren't really even an option for the replacement market, particularly since that replacement market was sort of, you know, I need it today or else.

Now with our distributor incentive they're stocking the motors, motors are being purchased, such now that they're starting to become -- high-efficiency is starting to become the standard in the high-efficiency market. I would say it's probably going to be a couple more years before it's sort of a fate accompli, but at that point then we're going to start raising the efficiency level up higher anyway and keep pushing that efficiency.

Similarly if we go back to the lighting example, in five years when you go back to replace the burnt out compact fluorescent that you got at Loblaws last fall, the range of energy-efficient products that are going to be there is going to be so much different than is there today that I would venture that you won't be buying the 60 watt incandescent lamp.

Q. Staying with that light bulb example that I've been using, could you tell me how the program costs would change if it turns out that the only way people will keep buying that high-efficiency light bulb is for Hydro to pick up the tab to a large extent?

MR. MacLELLAN: A. The program costs in

terms of cost/benefit won't change at all. We don't think that will be required, because once the product is definitely set in the marketplace and has established retail channels, as seems to be coming along quite nicely, we don't think that will be required.

We extended that program largely because of a supply issue of that product and retailers weren't used to stocking the product, it wasn't on their order sheets, it wasn't in their warehouse, it hadn't become established in that distribution chain yet, but the cost/benefits of the program, as it stands right now, are only until the end of this year.

If we end up having to extend the rebate for another year, the program still passes total customer cost test and it doesn't affect the costs much at all.

Q. I wonder if you can turn to page 16, please, of Exhibit 308, and this is Interrogatory 4.24.58. I've lost track of the number.

THE REGISTRAR: 261.53, Mr. Rodger.

MR. RODGER: Thank you.

---EXHIBIT NO. 261.53: Interrogatory No. 4.24.58.

MR. RODGER: Q. And we asked you to expand on sensitivity analysis on alternate levels of

system incremental costs and whether any other sensitivity analysis have been conducted on other key parameters.

When I say other key parameters, we are talking about market penetration, energy savings, capital costs, incentive levels and so forth. And the answer from Hydro was that:

> "There were no other sensitivity studies done for estimating Potential Induced EEI in the 1989 Demand/Supply Plan."

Now, if you just keep that answer in mind and flip over to the next page, to the next interrogatory, which is --

THE REGISTRAR: 261.54.

---EXHIBIT NO. 261.54: Interrogatory No. 4.24.63.

MR. RODGER: Q. And we asked again about uncertainty associated with --

THE CHAIRMAN: You had better put that number in. It's 261.54, it's Interrogatory No. 4.24.63.

MR. RODGER: Q. And we asked here about total resource savings and that there was uncertainty associated with these.

I want to read the answer to this

interrogatory response and perhaps from this you'll glean where I got the phrase "riddled with uncertainties" earlier this morning.

The response reads:

"The total resource savings associated with any demand management operation is the difference between the avoided cost and the sum of the incremental lifecycle costs of that option and the program delivery costs. Estimates of all three components are uncertain.

All estimates of system incremental costs used to calculate avoided costs are uncertain as the load forecast, capital construction costs, fuel costs, and the cost of money are all uncertain. The results of an investigation of the uncertainty in avoided costs is shown in Figure 6 of Exhibit 85. (Avoided Cost Update). Avoided costs are also uncertain as the magnitude and timing of the electricity savings from options are uncertain.

In many cases incremental costs and program delivery costs of demand

management options are not known with precision.

Customer payback is not part of the calculation of total resource savings. However it also is subject to uncertainty."

...

[3:15 p.m.] I am wondering, given this response, why the other parameters were not exposed to a sensitivity analysis?

MR. WILSON: A. Interrogatory 4.24.58 asked the question specifically with respect to the potential for electrical efficiency improvements, and I think the evidence there is that we have done a sensitivity analysis on possibly the most important and most tractable of the sources of uncertainty and that is the avoided cost. It is just a sensitivity analysis.

The question asked in Interrogatory 4.24.63 is a much broader one, and it's asking for uncertainty about the difference between costs incurred and benefits.

The uncertainty about any subtraction, the results of subtraction is the combination of uncertainty in all the elements. If we look ahead 25 years and think generically about all of the energy saving opportunities in each of the segments that have been identified in Exhibit 25 and 76, we recognize that we can't state with confidence that we know precisely what the lifecycle costs of all those measures are going to be, what the system is going to look like, how the power system is going to develop, and exactly what

timetable. And so those answers are basically reflecting our cognizance of sources of uncertainty.

The most prudent course that we thought we could take for Demand/Supply Plan of the demand management plan is to take our best shot at getting the most likely cost levels, make them credible, make them based, as Mr. Burke has explained to us, on what we know today, as opposed to technologies which are dreamed off and hoped for, but the ones that are demonstrated in the market and you can get cost and performance data for them, and on that basis provide a best estimate of how much efficiency improvement is economically available in Ontario.

Now, it would be conceivable, I guess we could have spent another year or so doing a sensitivity test, but that doesn't seem, to me, anyway, to be the right way for us to spend our time.

We have established this potential, we have made our best estimate of what is attainable, we are putting our time and effort primarily into program design, to put products in customers' hands and to gain experience and through that experience, to refine our grasp of what truly can be accomplished.

MR. BURKE: A. I would remind you again about the study we talked about this morning that was

done for the primary load forecast which looked at some of the major correlations and interactions between the determinants of EEI, potential and the load forecast itself, and simulated a variety of distributions to see what the bottom line effect was on the uncertainty band for the primary load forecast.

Sensitivity analysis has to be, in itself, an uncertain exercise because the statistical distributions of the various parameters are also themselves not well understood at this point. Given the limited historical experience, we don't know what some of the ranges are and what the shapes of the distributions would be, so that a sensitivity analysis is a somewhat arbitrary exercise.

Q. So, the actual defining of the parameters itself is still not certain at this stage?

A. No. We have the parameters. Because we haven't got years of history of penetration rates under different circumstances, we can't say with confidence that a penetration rate for a certain program is normally distributed in plus or minus 5 per cent or 10 per cent at a concern confidence level and then do some sort of sensitivity analysis at the upper or lower end of that.

We are using the best estimate in each

case and working out the best projection. But from a material point of view, it's the primary load forecast uncertainty that really matters in this. That's the study I am referring to which was submitted to a number of intervenors for Panel 1, it does a range of sensitivity analyses, as I say, on these major parameters.

Q. Let me leave that for now.

Mr. Wilson, in your direct evidence you quoted from the Lieutenant Governor's Speech from the Thrown last November, and as part that quote you said that these new energy directions, the directions of government, including Ontario Hydro, will be a challenge to all the citizens of Ontario. Do you recall making that reference?

MR. B. CAMPBELL: Do we have the source?

MR. RODGER: I am sorry, I don't have a source for that.

MR. WILSON: I recall, that's the sense of the remark. I don't know whether those are exactly the words.

MR. RODGER: Q. I believe it was Ms. Mitchell, and I thought this was quite appropriate, she discussed each individual Ontarian as being an important link in the demand management chain. And

that was at page 8666. I don't know, Mr. MacLellan, do you recall reading that phrase of Ms. Mitchell's?

Perhaps to make it quicker, would you agree that demand management can be seen as links in a chain, it's going to take the involvement of everybody in the province to make it work?

MR. MacLELLAN: A. Yes, I certainly agree with that.

Q. With respect to demand management programs, when you consider the general public, the commercial, residential, industrial sectors, the government, the municipal utilities, that there are, in fact, several million links in this demand management chain.

A. Well, in the residential market there are certainly a lot of links in the chain. We tend to treat them like groups of like-minded people I guess, but yes, there are several million links.

Q. The point I am trying to make, it's going to take an effort on everybody's behalf in the province to make this thing work.

A. It will certainly take participation by everybody to make it work, a recognition of the need by everyone, and demonstration of the opportunities by some key groups.

Q. I am now starting point 5 on my outline, I have phrased it, "Determining how decision-makers make decisions."

Ms. Fraser, on page 8757 you testified that what was critical in discussing demand management is understanding the marketplace and the needs of the decision-makers. And you spent a lot of time in your testimony reviewing how decision-makers decide and what the priorities were for decision-makers, be they in the residential, commercial, industrial sector. Do you recall that testimony?

MS. FRASER: A. Yes, I do.

Q. With respect to builders and developers, I recall your testimony to be that their high priority items were things like access to subway stations, marble entranceways, high speed elevators, flexible floor space, that kind of thing.

A. This was an example of a speculative developer who was going to build a building and then sell it immediately.

Q. Okay. And you also said at 8758, lines 15 to 21, that the factors affecting their decisions, and their decisions being builders, developers are complex and rarely based on energy consumption. Those are factors which are much more

important to their decisions than the future energy supply.

A. Energy consumption.

Q. And at page 8611, Ms. Fraser, you also stated regarding individual customer spending, you said that generally customers don't make their decisions on the basis of what is economic from a total customer perspective. And I am quoting now:

> "In reality, there are market and institutional barriers which prevent customers from adopting these cost-effective energy saving technologies."

Do you recall that?

A. Yes.

Q. Now, was it your testimony that that last observation that I read, that includes all three sectors, industrial, residential and commercial, or are you primarily talking about the commercial and residential sectors?

A. I was talking about all.

Q. All sectors.

A. All four sectors, including the agricultural.

Q. So once again, if we return to my

initial discussion this morning, we are back to the idea of behaviour modification, that Hydro will be able to change behaviour to a certain extent by pointing out to consumers that a particular option is economic and that the consumer is going to respond, you're right, I am going to buy it.

A. Well. Behaviour modification in a very broad sense. We are not just talking about turning the lights off, although that's an important part of what we are doing, making sure people aren't wasting energy, but it's purchase decisions and the way in which decisions are made. It's the kind of information they take into account when they are making decisions, and even just knowing the price of electricity sometimes will be a new piece of information for them.

Q. Do you feel that Hydro's understanding of what makes decision-makers decide, does Hydro think that its understanding of that sufficient with respect to achieving the demand management targets that before this Board?

A. No, and that's why we will be continuing the market research efforts that we are doing and we will be continuing to fine tune as we go along.

We have been doing market research on customer decision-making processes for quite some time. The registry of market research summarizes those in the last, I think in the last two or three years.

I know we have been looking at in commercial, following that decision-making process through, to understand where these decisions get made, we do it in residential, we do it in industrial and agricultural as well.

The results of our programs as we do -- the program evaluations give us more and more information. Our field staff work directly with customers in the commercial and industrial, it's a one-to-one basis with customers. They get to develop relationships, understand the way the decisions get made in different organizations.

Our allies in terms of working with manufacturers, in terms of understanding how the lighting market works before we developed our lighting program, it wasn't just how decisions got made by the end-use consumers; it's how the distributors make decisions about what lights to stock, how do manufacturers make decisions about what lights to produce. There are a lots of decisions that we have to come to understand. And I would by no means

characterize that we know everything there is to know about -- it's probably an infinite amount of decisions.

I think what we have done is we have got a pretty good start.

I think some ways our measure in our market approach, our marketing approach, strategic marketing approach to energy management has in some way given us a leg up on some of the other utilities, the U.S. utilities that have taken a more technology kind of approach to it.

I can remember being at a conference where a representative from Pacific Gas and Electric, the revelation that he was putting forward, this was after 10 years of demand management activities, was that the allies were important and being involved in the trade groups was important. Well, that was almost our starting point. It wasn't something that we waited ten years to find out.

So, that's really where we are. We don't know it all, but we are certainly expanding our level of knowledge. I think we have got a fair stock of understanding some of the markets. There is still lots to learn.

Q. So there a fair way to go before there is a complete understanding.

A. I don't think there will ever be complete understanding because I think the market is going to change and we are going to help make it change.

Q. To give an example, Ms. Fraser, you mentioned earlier on this morning about the program with the hotels and how at first it was a non-starter, and was it four times the increase?

A. We tripled the incentive, from 50 to $150 a unit.

Q. And that started to have an impact. So that would be an of that --

A. Yes. Because we had an understanding of what the payback threshold was in the hospitality industry and it had to be below three years.

Our original analysis said that the $50 incentive per unit would bring that application down to that kind of a payback.

But as I indicated this morning, our analysis indicated it was $250 a unit, but the installed cost would be $450. And with the higher incentive we managed to then still bring back -- we understood the decision-making criteria, but what we didn't have a good enough handle on, because the product hadn't been sold and installed in Ontario

before, is what those local costs were.

As a result of that program, actually, a manufacturer has started manufacturing those products in Canada. So, those sorts of things, and they are really marketing that program for us.

MR. WILSON: A. Can I just add one point on understanding how this decision-making process works.

We recognized again from the outset that one of the key strategies is leverage, and Ms. Fraser described one aspect of leverage. But another one is very simply that we don't have to know how everybody makes decisions for us to design good programs and to have them be effective.

Architects understanding how building and developers make decisions is important, and so it is important for us to communicate our programs to architects and architects can sell our programs for us. Manufacturers can sell our programs for us because they know how to deal with their customers.

As a consequence, we are relying on this small chain of influencers, and a big piece of our fundamental strategy is to rely on the intimate knowledge people in the chain have of the next people further down the chain. Rather than require

omniscience or some supernatural knowledge represented by some of the people here, pretty bright people but they will never master all of this. We will just never get to know 9 million people personally and what is going to make a difference for them. But there is someone who knows what each of those each 9 million, what it takes to make them make a choice. So we are motivating all of them to make that effort.

Q. And understanding, it's going to take a period of time to build up that networking; is that correct?

A. Yes. And as it's developing very quickly, if there is something in it for people to make of the effort to get involved.

Q. I take it you feel that networking can be built up by the year 2000?

A. Oh, yes, I think so. Well before then.

MR. RODGER: Mr. Chairman, I am turning to a new section, I don't know if you want to break now or if you like, I can continue.

THE CHAIRMAN: We will break for fifteen minutes.

THE REGISTRAR: This hearing will recess for fifteen minutes. ...

---Recess at 3:57 p.m.

---On resuming at 3:55 p.m.

THE REGISTRAR: Come to order. The hearing is again in session. Be seated, please.

THE CHAIRMAN: We'll be adjourning this afternoon no later than a quarter to five.

Mr. Rodger.

MR. RODGER: Thank you, Mr. Chairman.

Q. I would like to turn to a new area which I've described on my outline as the role of the general public.

Now, since so much of Hydro's demand management program, as I understand it, is going to rely on members of the general public to achieve the demand management targets that are before this Board, I was somewhat surprised that Hydro led no evidence with respect to how the 10 million residents of Ontario view energy matters and the issue of energy conservation, since they are such crucial links in this demand management chain.

I wonder if I could refer you to Exhibit 306, which is entitled: A Study of Ontario Public Opinion Toward Energy Issues and Activities for the Ministry of Energy, and this is dated February, 1991, prepared by Decima Research.

Now, I didn't provide copies of the entire survey, but I have provided the executive summary that I would like to go over.

Before I begin, panel, does the Ministry of Energy, does it regularly provide you with information such as this since the government as well is a key ally in this?

MR. MacLELLAN: A. Not regularly, no.

Q. So you haven't seen this study before, other than when I presented it to you?

A. No. We have a variety of similar studies of our own to do the same kind of psychographic clustering, but we haven't seen this one.

Q. Would it be helpful to Ontario Hydro if the Ministry of Energy and other government ministries shared this type of information?

A. If they do public opinion research that's radically different from what we do, then the answer is yes.

Q. Now, I provided this to you before your direct evidence. Have you all had a chance to look at it.

(no response)

I see nods. Okay. Perhaps if I could turn to page 1 of the executive summary. I don't

intend to read it verbatim, but I want to highlight on some, what I perceive, as key points.

And at the first paragraph it discusses the Ministry of Energy's mandate and, that is to:

"Ensure access to adequate, diverse and secure energy supplies at reasonable prices;

Encourage energy efficiency and conservation; and

Work to minimize the environmental impact of energy production and use."

And if you go down two paragraphs it talks about the rationale for this survey, and the second sentence of that paragraph states:

"In the development and implementation of new policies and programs, it is important to understand the public's current position on energy issues."

Now, if we turn over the page we will see a Section B. Orientation to Energy Conservation, and I just want to read that paragraph:

"Results from this baseline survey indicate that opinions about energy efficiency are mixed, hence, opinions may not be fully formed in terms of the

urgency or need for conservation.

For example, there is a general belief that an energy shortage is likely in the next few years (63%), although assessments of potential shortages in specific energy sources is lower: oil 56%, gasoline 52%, electricity 47%, natural gas 36%. Hence, these results suggest that:

there is a level of concern about future supplies of energy in some areas, but not others, but.

there is not a strong sense of urgency for the need to confront energy supply issues."

Now, over on the next page, the fourth paragraph down, and this impacts on our earlier discussions here today:

"Part of the juxtaposition between the complacency expressed by the reliance on leadership through areas such as science or government direction, and on the other hand the belief among respondents that they can make a difference, may also be related to the finding that 51% believe

they have enough information about energy efficiency to make decisions, and only 43% expect to have to make adjustments to their lifestyle to accommodate a lowered reliance on energy. Hence, one interpretation of the results is that respondents believe reducing their use of energy will be fairly easy and painless another is that they understand what is involved in becoming more energy-efficient and do not view this as an onerous task."

Now, Mr. Rosenberg - if you could flip over to the next page - he introduced a study and he went over certain terms about how, for example, Ontarians were classified. And this study does a similar exercise, it breaks down the province into four categories.

We see the first category is assertive individualists, second category is optimistic followers, third category environmental moralists, and the fourth category is the unconcerned, which I see represents 17 per cent of the respondents.

Now, in terms of the next heading, Energy Efficiency Behaviour, the second paragraph reads that"

"Respondents also state that they themselves could do more to use less energy (80%). However a smaller percentage (59%) plan to decrease the amount they use over the next year."

And the last paragraph, which talks about reasons for conservation, it reads:

"The primary motives for these undertakings are energy savings (31%)...", and when it says 'the primary motives for these undertakings', that relates to a variety of home renovations,

"...are energy savings (31%), and monetary savings (23%), with the remainder providing a variety of non-conservation reasons. However, the results suggest that energy conservation is not the primary motive for these actions."

And lastly, if you could turn over to page 6, they come to the conclusion that, and I'm quoting:

"This low position of conservation as the rationale is further suggested by the finding that the level of

participation on various energy efficiency activities is not correlated with any of the attitudinal or lifestyle values. The attitudes with the strongest correlation are perception of an oil or gasoline shortage, and a predisposition to doing more to conserve.

In other words, whether people participate or not in energy-saving activities is not determined by their approach to the issue of energy conservation. Hence, a key barrier to undertaking activities, increasing the amount they do, or sustaining present levels of activities is a lack of a focus on the rationale for energy conservation. The only attitudes slightly related to energy efficiency activities are perceptions of shortages in the four fuel types; interestingly, however, these attitudes are not correlated with home renovation activities."

Now, I would just add that the results in

this survey may claim to be accurate within plus or minus 3.1 per cent, 3.1 percentage points 19 times out of 20.

If I can summarize the conclusions, and I don't want to read all of them - I take it you've read the document. I have seven conclusions from this report and I want to see if you'll agree with me.

The first is that there is no sense of urgency to confront energy supply issues; the second is that only 43 per cent expect to have to make adjustments to their lifestyles to accommodate a lower reliance on energy; the third is that reducing energy will be fairly easy and painless; the fourth is, those that don't care about demand management-type activities constitute almost one out of every five people in the province - that's the unconcerned category, and that represents about 2 million people in this province - while 80 per cent could do more to use less energy, only 59 per cent plan to do so, and the factor which motivates people to conserve energy is the threat of oil or gasoline shortages, not electricity-related issues, and there's little linkage between energy conservation and home renovation activities.

How does this survey fit with your understanding of the public's perception of energy

issues. Would you suggest that, based on your survey, your reports, that this accurately reflects your information?

MR. B. CAMPBELL: Mr. Chairman, it's a very general question which will undoubtedly, the question itself, will occupy many, many pages in the transcript.

I'm not sure that - I'm happy if the witnesses tell me they're content to answer the question - I'm not sure that that kind of broad comparison is something they should be asked to do on the spot.

These people have had many inches of paper handed to them each day over the last several weeks and are expected magically to be thoroughly familiar with each and every page by the time the next cross-examiner comes up. They worked very hard at it, but I'm a little reluctant to expose them to respond to such a sweeping question as that without a little more opportunity to think about it, if they wish.

And if they don't wish, that's their business, but I think they should be given the opportunity to at least give a little thought to it, if they want to.

THE CHAIRMAN: What they've got is Mr.

Rodger's summary of the executive summary of a larger study. I'm not quite sure, you're asking whether they agree with your summary, or...

MR. RODGER: Well, Mr. Chairman, I'm just concerned because so much of the demand management program is going to depend on the public. We haven't had any evidence from Hydro led on what the public, what are their perceptions on energy and energy matters.

THE CHAIRMAN: Well, that might be something you could ask them. They have said that they have - just a few moments ago - that they have their own studies and they have, in the course of weaving through the various answers, have explained why certain things have happened or have not happened because of their perception of public attitude.

So I'm not quite sure what you want them to tell you. I think perhaps Mr. Campbell is right, you should be a little more specific in the kind of questions.

If you want to take them through your conclusions one by one, but I had some trouble even noting them down as you were going through them because you went through them pretty fast.

MR. RODGER: Well, they all can be found,

Mr. Chairman, in the last two pages of the handout, that's where the conclusions are.

THE CHAIRMAN: You've mentioned that.

MR. RODGER: The summary of recommendations.

THE CHAIRMAN: I thought they were your own conclusions?

MS. PATTERSON: No, a summarization.

MR. RODGER: I should have made that more clear.

THE CHAIRMAN: Why don't you ask them a question specifically related to the various conclusions rather than a general question, because I think it's very difficult to answer.

MR. RODGER: All right.

Q. We talked this morning about the problems, the time pressures involved in achieving these targets, and one of the conclusions from this survey is that there seems to be no sense of urgency among members of the general public.

Does that lack of a sense of urgency, does that correspond with your understanding of what has to be done to get the public on side from the studies that you've done and the surveys that you've done on public opinion in this matter?

MR. MacLELLAN: A. I think this report's conclusion in that regard generally agrees with some of the things we've done, but I'm not sure that -- there are two aspects to that: I'm not sure we need a huge sense of urgency to accomplish our demand management plans, and I'm also not sure that focusing on a sense of urgency is an appropriate tactic to use to cause people to undertake some change.

We have done a little bit of research into fear as a tactic and it's generally frowned upon, so we'd rather not use that anyway.

So we'd rather sell demand management on its own phrases -- I just sent Mr. Campbell into convulsions over there, but that's okay.

I think we'd rather sell our energy conservation initiatives on their own merit and, to date, it's been working.

Q. And if this report is correct, doesn't that give you concern about your likelihood of achieving those targets if, in fact people, don't have a sense of urgency and say: Well, it doesn't have to be done this month, it doesn't have to be next year, it doesn't have to be done in five years.

MR. B. CAMPBELL: Well, where does it say that, Mr. Chairman?

MR. RODGER: Well, it says that there's no sense of urgency to confront energy supply issues, and I thought we established this morning that Hydro is going to have to go full throttle - in Mr. Burke's words - for the rest of the decade in order to achieve these.

And isn't it a concern to Hydro, if this report is right and there isn't that sense of urgency, that we have to get going to meet these targets?

MR. B. CAMPBELL: I think Mr. MacLellan has addressed that question, it was that we won't don't have to do anything this month, this year or five years from now.

I don't see anything like that in this material that you've provided.

THE CHAIRMAN: There is some evidence to the effect that even though people in Ontario may not have a great sense of urgency, they have perhaps a little more concern than people in the United States on these issues.

MR. MacLELLAN: They are a little more environmentally or conservation concerned, and to address the issue of when they're likely to do it, we try to concentrate on the appropriate times in someone's purchase decision or product lifecycles to

try and help that to occur.

We try to -- for example, in the appliance area, we're trying to concentrate on when equipment fails or when they have an under-utilized appliance that they want to get rid of, so we try and hit them at the time that's appropriate with a program and an initiative and an incentive that is sufficient to cause behavioural change.

So that's why I was saying before that I'm not sure that we -- that we are in desperate need of that sense of urgency and that people don't feel it's appropriate to market a program by saying: If you don't take this action you're going to run out, that's actually what I meant by fear as a tactic, but we have are tried to find out how people -- how appropriate people feel various approaches to them are.

So, as I say, I'm not sure that's critical.

MS. FRASER: I would just like to add, sort of reiterating what I said earlier, that the fact that we've taken the strategic marketing approach to segmenting our customer base, we don't think of the 10 million people in Ontario as just the general public, they're customers, they're energy consumers, they're decision makers, they're business people running this

kind of plant, they're business people running hotels, they're homeowners, they're apartment dwellers, and so we segment and understand what their needs are in each of those markets.

And, as I also indicated earlier, that we've done a lot of market research in those areas and summaries for the last three years of market research are in the Registry of Customer Research which is attached to 4.7.20, 4.12.73, 4.19.25. I think 4.12.73 was filed yesterday.

And there were a number of studies there. They were Ontario Hydro studies that Mr. Rosenberg was referring to, not somebody else's studies. So I think the whole essence here is that is not treating the 10 million as "the general public".

And I'm just trying to recall, that particular piece of research, what basically I think it shows us, that when you ask a question of someone as the public they quite often respond very differently than they do when they're thinking about in the sense of being a homeowner or being a manager of the Harbour Castle Hilton, or whatever, and lots of people have two or three, maybe four hats to wear, and you've got to appeal to them in the decision-making capacity that's most important for you to get that decision made with

respect to energy-efficiency.

And I think a general public policy appeal with respect to some of the issues that are tracked in this, which I think is extremely valid for a Ministry dealing with policy issues to sample the population on that basis in terms of policy issues, but when we're doing it from an energy management point of view we're doing it on much more of a strategic focus, segmented kind of, and that's been much more helpful for us in terms of designing programs.

Quite frankly, a piece of research like this doesn't help me design a commercial program - and I don't want to speak for Mr. MacLellan - but I don't think it would help him design a residential program.

MR. RODGER: Q. So, for example, the finding that people would appear to believe that reducing energy will be fairly easy and painless, and we talked for example earlier on today about Case E and the huge costs that could be involved, that public opinion, that wouldn't come into play when you're designing, for example, a Case E type scenario where there could be significant expenditures and presumably anything but painless?

MS. FRASER: A. Well, insofar as -- we haven't even scoped out in detail what programs might

be in Case E. I don't think that putting a question to a customer even in general terms that's in that scenario would be very meaningful until we started seeing exactly what that meant to them, until we started dealing with those particular issues at that level.

So I think part of what this information tells us, people don't think it's going to be very difficult and they can do it right anyway and they've got the information.

Then I think we still have an awful lot of work to do in terms of educating the public and educating consumers, decision makers the extent to which technology has improved, the extent to which all sorts of things have happened.

When we survey some commercial customer: Oh yes, I have efficient lights because I have fluorescent. Well, there's fluorescent and then there's fluorescent and then there's fluorescent, plus there's lots of other technologies.

...

[4:15 p.m.] It's increasing that awareness and that's what we are working on and that's what we are doing, and we proceeding on that basis.

It doesn't surprise me that if you are going to characterize this study as a barrier in the sense that the public don't appreciate the seriousness of what we are about, yes, it's a challenge, and that's one of the challenges that we are addressing, we are working through that. Not to repeat, but we are doing that in a very segmented and targeted way as opposed to a mass communication kind of approach.

MR. BURKE: A. Actually, my interpretation of this study, and I am certainly the least experienced in all this kind of thing here, is that this was really commenting on what people would do without programs. I thought this was common to what people would do naturally and it didn't really address the issues of how people would respond to programs of different kinds.

Q. All right, we will move on.

MS. FRASER: A. You missed one of the best parts of it here. The core of people who have actually made contact with an organization to obtain information on energy efficiency, the most frequently named is Ontario Hydro. The information has not only

been useful but two-thirds took some action as a consequence, so...

Q. I was very happy to see that as well.

A. That leadership role we are after must be there.

Q. So there does put some reliability in this document after all! (Laughter)

Okay. I want to take a look at the residential sector and some specific programs. The first is the thermal envelope measures. If you could just bear with me for a minute.

With regard to these measures, and thermal envelope measures, I mean ceiling, floor, basement, wall insulation, door and window upgrades, and so forth, I understand that the estimate of potential EEI in the residential sector is based on your survey of a thousand electrically heated homes and consulting reports; is that correct?

MR. BURKE: A. It's correct for Exhibit 76; it's not correct for Exhibit 25.

Exhibit 25 states explicitly that we -- only preliminary results from the thousand home audit. In fact, we had results from about 34 homes out of the thousand.

Q. If you could turn to page 7, please,

in Exhibit 304. This is the results of the estimation process from Exhibit 25. I want to compare some of the results here with the results on the next page, page 8, which is an excerpt from Exhibit 76, Table 3.3.13, and for example, if you go back to page 7 you will see "Window Insulation: to R32."

A. I should point out that is a typo, It's 3.2.

Q. All right. And that shows potential savings of 83 megawatts for the year 2000.

A. Yes.

Q. Now, in Exhibit 76, it's over on page 8, the window upgrade, which is under the first list under the column "Existing Houses", the window upgrade has been changed and increased to 165 megawatts.

Now, I understand Exhibit 25 and 76 to be about a year apart in terms of when they were drafted. I wonder if you could tell me, what were the reasons for such a significant increase? What changed?

A. Well, Exhibit 25, I believe, is a-year-and-a-half.

Anyway, the difference is the completion of the thousand home audit study and the use of the final set of results as opposed to the preliminary results that we had available to us for Exhibit 25.

So that it turned out that the small number of houses that I just mentioned that were used as the basis for the analysis in Exhibit 25 were not representative of the thousand houses to the extent that there are some differences here. That is a major distinction.

Another major issue is that it is actually two load forecasts apart. The residential sector in Exhibit 76 is based on the 1990 load forecast, and in Exhibit 25 it is based on the '88 load forecast. This is existing houses.

There are actually more existing houses in the 1990 estimate, I believe, in Exhibit 76, than there were in the '88 estimate.

Existing, though, is always defined to be the number of houses by the year 1990, but I think the number of those is actually higher in Exhibit 76.

So, those are two elements that contributed to the increase in numbers.

I think in general you will find that some measures have -- well, there is an increase in many of the weatherization measures, and that's in part due to the change in the number of houses. But the quality of the information that was used in Exhibit 76 is much superior to the quality of information used in

Exhibit 25.

Q. And the quality of that information, I am not sure I understand what in that information told you that the potential would be higher?

A. Well, each and every house in the thousand home study was analyzed independently for its potential. The analyst was aware of what the base case conditions were, what the likelihood was that windows would be replaced in that house by the year 2000, and so the likelihood that we would actually be able to -- that the potential existed for some of the more expensive window upgrade measures, and so on.

The cost information perhaps is also more up-to-date and reflects current technology better than in 1988. A variety of elements of the analysis that I think are better in 1990 than they were in 1988.

Q. Would I be correct if I say that the economic information between those two exhibits, 25 and 76, they change quite considerably as well? Would you attribute those changes to the same reasons?

A. What do you mean by the "economic information"?

Q. Perhaps we could turn to page 9 of that same exhibit. For example, on page 9, two-thirds of the way down, it says "Windows R1.8 to R3.2", and it

shows premium capital costs in 1989 dollars of 755.

If you go over to the next page, page 10, which is from Exhibit 76, you see under the first group of end-use technologies, under "Thermal Envelope Measures, Window Upgrade," still in 1989 dollars but the cost now is 2,633, a substantial increase in again a-year-and-a-half.

A. Yes. It's nothing to do with the passing of time; it's to do with the completion of the study and the quality of study.

Experienced auditors were going in, these are people who would have a pretty good sense of what a contractor would bid to actually do the job, and it was that sort of real world information that was being used in the later estimates, whereas in the earlier estimates I don't think we had that sort of information.

Q. That was quite a significant jump, 755 to 2,600.

A. Yes. I guess what I am trying to suggest is that it is not as if we made two good estimates and something has changed in between. We are quite prepared to accept that the estimate made earlier was not as well informed about the full costs, including installation and so on, and the practical

circumstances that windows actually have to be installed, as now, and now we feel we have a very good estimate.

Q. And I think in all fairness, this is certainly no fault of Ontario Hydro; it is just once again the point that there is just no track record, or there was no track record on which you could gauge your costs, and as the real world scenarios are coming in, you have to re-evaluate.

A. Well, that's what I am trying to say. It's not re-evaluating. I think from our perspective this is -- essentially, Exhibit 76 presents a very complete evaluation for the first time.

I wouldn't want there to be a sense that each time we do this, we would expect the numbers to change in some way. I would hope that we have a good sample now and it is realistic and real world, and I would not have been able to be that confident about Exhibit 25.

Q. With respect to the incentives that Hydro offers for thermal envelope measures, is there a difference among the incentives among the various measures, for example, is there a difference between ceiling measures, compared to wall measures, compared to basement measures?

A. I'm not sure I understand your question in the sense that -- if it is referring to the material here, then there is nothing about incentives here.

Q. No, I appreciate that. It is just a question I was having trouble finding the answer to.

MR. MacLELLAN: A. We don't have incentive programs for that entire list that you have on page 10.

We have incentive programs for some, we are developing incentives for others, and others are a couple of years out.

But to answer the question, each incentive is set separately based on the avoided cost of each measure, and based on what is needed to move that market in the direction and to the extent we need.

Q. Is it too early for Hydro to determine what is the correct payback period or incentive level for thermal envelope measures, or are we just too early into the process at this stage?

A. It's too early, and we would probably break up what you are describing as thermal envelope measures into the component parts, depending on how each is purchased and how each is installed and the market dynamics of each area.

MR. RODGER: Mr. Chairman, I am in the position that I have covered a lot more ground today than I thought I would. Perhaps if I could have the evening to go over my notes, I think I might be able to finish by no later than lunchtime tomorrow.

THE CHAIRMAN: I had a slight deja vu about that comment. I think you had the same problem on Panel 3.

MR. RODGER: It's actually very nice.

THE CHAIRMAN: That is fine. We will adjourn then until tomorrow morning at 10:00.

MR. RODGER: Thank you.

THE REGISTRAR: This hearing will adjourn until 10:00 tomorrow morning.

---Whereupon the hearing was adjourned at 4:30 p.m., to be reconvened on Thursday, September 19, 1991, at 10:00 a.m.